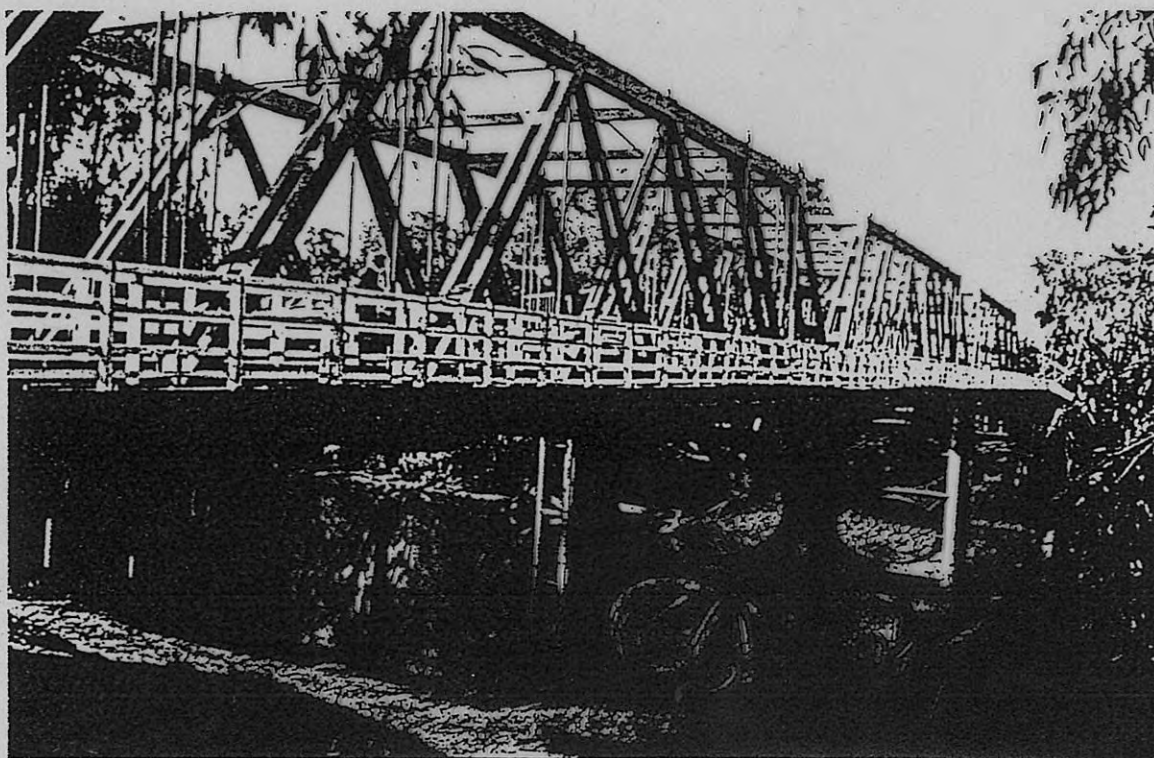


# HAMPDEN BRIDGE WAGGA WAGGA

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HISTORIC ENGINEERING MARKER

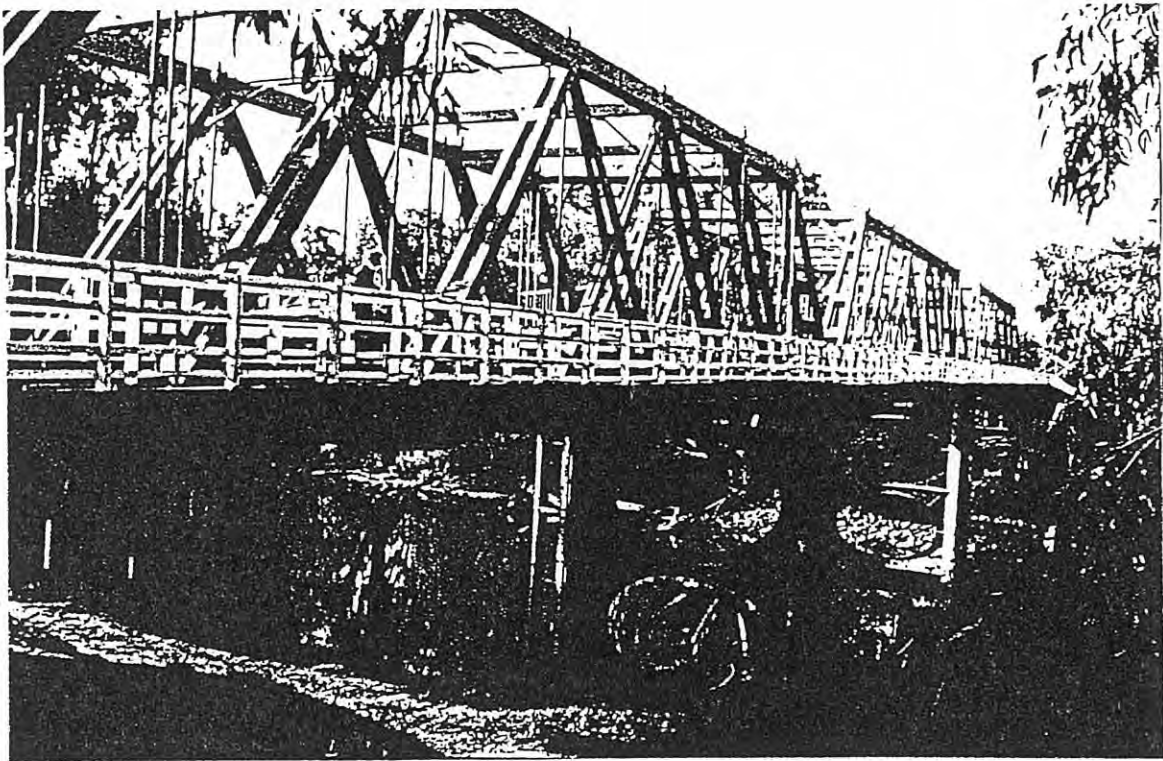


ENGINEERING HERITAGE COMMITTEE  
SYDNEY DIVISION, I.E. AUST. 1992

# HAMPDEN BRIDGE WAGGA WAGGA

---

HISTORIC ENGINEERING MARKER



ENGINEERING HERITAGE COMMITTEE  
SYDNEY DIVISION, I.E. AUST. 1992

## Commemorative Plaque Nomination Form

To:  
Commemorative Plaque Sub-Committee  
The Institution of Engineers, Australia  
11 National Circuit  
BARTON ACT 2600

Date:..... March 1992 .....

From..... Sydney Division .....

.....

.....

.....

(Nominating Division or Branch)

The following work is nominated for an \*Historic Engineering Marker/~~National Engineering Landmark~~ award:

Name of work ..... Hampden Bridge .....

Location, including address and map grid reference if a fixed work .....

..... Murrumbidgee River .....

..... Wagga Wagga .....

Owner ..... Roads and Traffic Authority .....

In support of the nomination the following information is provided:

### For an Historic Engineering Marker (HEM)

(1) Proposed wording on HEM# ... See Attachment

(2) Justification - please make data as complete as possible.#

See Attachment

### For a National Engineering Landmark (NEL)

(1) Date of construction (or other significant dates).

(2) Names of key professional personnel associated with the work.#

(3) Historic engineering significance of the work.#

**DATE OF CONSTRUCTION:** 1895

**ENGINEER:** Percy Allan

**SIGNIFICANCE:** Hampden Bridge was the first example of a longer span (33.6m) version of the famous Allan Truss. At the time of its construction it was described by its designer, Percy Allan, as "by far the largest timber structure yet attempted in the colony". There is only one other remaining example of these long span Allan Truss Bridges and the Hampden Bridge remains in excellent condition.

**LISTINGS:** The Register of the National Estate  
The New South Wales Register of the National Trust  
The Institution of Engineers, Australia

**I E Aust  
Crest**

## **HAMPDEN BRIDGE**

**THIS BRIDGE WAS BUILT IN 1895. IT WAS DESIGNED BY PERCY ALLAN, AND WAS THE FIRST EXAMPLE OF HIS LONG SPAN (33.6m) ALLAN TRUSSES. IT WAS SAID BY ITS DESIGNER TO BE THE LARGEST TIMBER STRUCTURE ERECTED IN THE COLONY. IT REPLACED AN EARLIER TIMBER BRIDGE THAT WAS BUILT IN 1862 TO MAINTAIN TRADING LINKS BETWEEN THE RIVERINA AND SYDNEY, RATHER THAN TO MELBOURNE USING THE BRIDGE OVER THE MURRAY.**

**THE INSTITUTION OF ENGINEERS, AUSTRALIA  
THE ROADS & TRAFFIC AUTHORITY**

# THE REGISTER OF THE NATIONAL ESTATE

02/92

## AUSTRALIAN HERITAGE COMMISSION

PAGE: 1

NAME OF PLACE HAMPDEN BRIDGE  
----- MURRUMBIDGEE RIVER ROAD BRIDGE  
015925 1/06/323/0014/01  
REGISTERED

## LOCATION/BOUNDARIES:

-----  
Hampden Avenue over Murrumbidgee River, Wagga Wagga.

## TITLE INFORMATION:

## STATEMENT OF SIGNIFICANCE:

-----  
PERCY ALLAN IN 1893 DESIGNED A STANDARD TYPE OF TIMBER TRUSS BRIDGE, CALLED THE ALLAN TRUSS, WHICH CONTINUED TO BE BUILT AT LEAST UNTIL 1920. IN ITS ORIGINAL FORM IT WAS USED FOR 21.3 AND 27.4 M SPANS. IN 1895 HE EXTENDED TO THE DESIGN TO SPAN 33.5 M, THE FIRST BRIDGE OF THIS TYPE BEING AT WAGGA WAGGA, 1895. THE SYSTEM USED TIMBER HOWE TRUSSES, WITH TIMBER TOP AND BOTTOM CHORDS, TIMBER COMPRESSION DIAGONALS AND TENSION RODS AS VERTICALS. ITS CHIEF FEATURES WERE - BECAUSE IT HAD NO COUNTERBRACES, IT WAS POSSIBLE TO ADJUST THE GEOMETRY BY SCREWING UP THE VERTICALS, COUNTERACTING THE EFFECTS OF SHRINKAGE, THE DIAGONAL MEMBERS WERE CUT OFF SQUARE AT THEIR ENDS, PRESSING AGAINST SPECIAL CAST IRON DETAILS AND DOUBLE TIMBERS WERE USED TO ALLOW FOR REPLACEMENT. THE SHORTER SPANS WERE HALF-THROUGH. THE DEEPER 33.5 M SPANS WERE THROUGH TRUSSES, WITH AN UPPER LATERAL SYSTEM. THE SPAN OF 33.5 M FOR A TIMBER TRUSS WAS, AT THE TIME OF OPENING, EXCEEDED ONLY BY THE LACHLAN RIVER ROAD BRIDGE AT COWRA (1893, 48.8 M). ALLAN TRUSSES OF THE SAME SPAN WERE LATER BUILT AT INVERELL, 1896 (SINCE REMOVED) AND MORPETH, 1898. THE BRIDGE IS OF CONSIDERABLE TECHNOLOGICAL SIGNIFICANCE.

## SIGNIFICANT ASSOCIATIONS:

-----  
PERCY ALLAN  
DESIGNER/ENGINEER

## SIGNIFICANT DATE(S):

-----  
1895

## DESCRIPTION:

-----  
THE BRIDGE HAS NINE TIMBER GIRDER APPROACH SPANS 9.5M, EIGHT AT 10.7M, FOLLOWED BY THREE 33.6M THROUGH-TYPE, ALLAN TRUSS SPANS. THE ROADWAY WIDTH IS 7.4M ON TRANSVERSE TIMBER PLANKS WITH TIMBER STRINGERS AND CROSSGIRDERS. THE MAIN SPANS ARE SUPPORTED ON TWIN METAL CYLINDER PIERS.  
IT WAS OPENED TO TRAFFIC ON 11 NOVEMBER 1895.

## CONDITION:

-----  
THE BRIDGE IS IN USE. IT APPEARS TO BE IN EXCELLENT CONDITION AND IN ITS ORIGINAL FORM.

## BIBLIOGRAPHY:

AUSTRALIAN HERITAGE COMMISSION

PAGE: 2

- C O'CONNOR, "REGISTER OF AUSTRALIAN HISTORIC BRIDGES" 1983.
- C O'CONNOR, "SPANNING TWO CENTURIES" UQP 1985.
- P ALLAN, "THE WAGGA WAGGA TIMBER BRIDGE, NSW" ICE MINUTES OF PROC,  
VOL 128 (1897), PP 222.
- E G TRUMAN, "TIMBER BRIDGE CONSERVATION IN NEW SOUTH WALES" DISSER-  
TATION PREPARED FOR UNIVERSITY OF YORK, 1982.
- D J FRASER, "TIMBER BRIDGES OF NEW SOUTH WALES" I E AUST, MULTI-  
DISCIPLINARY TRANSACTIONS 1985, PP 92.

# THE NATIONAL TRUST

WAGGA WAGGA

HAMPDEN BRIDGE OVER  
THE MURRUMBIDGEE RIVERSpanning the Murrumbidgee  
River and linking North  
Wagga with the city via  
the Olympic Way

(Town or District)

2650 Wagga Wagga City

Post Code  
Local Govt Area CouncilAuthor of  
Proposal J MorrowDate of  
Proposal 29/5/84

(Name or Identification of Listing)

(Address or Location)

Suggested  
Listing  
Category CLASSIFIED

Bibliography

Owner and Address  
Department of Main RoadsCommittee  
(Trust Use) IACCouncil  
(Trust Use) APPROVED  
23-7-84

## Description

Briefly cover the points on the following check list where they are relevant and within your knowledge.

## Style

Construction  
Use

Architect/s

Builder/s

Date of  
Construction

Present

Condition

History

Owners

Boundaries  
of proposed  
listing

Located at the northern end of the main commercial spine of the city, this timber truss bridge provides the main link between North and South Wagga Wagga. It replaces an earlier timber bridge built 1862.

The Hampden Bridge is of timber truss construction designed by Percy Allan at a cost of 28,260 pounds, it took two years to build, completed in 1895.

Six timber trusses rest on iron cylinder piers and concrete abutments forming three spans over the river. The approaches over the flood plain are supported by nine timber girders. The deck was originally formed with lateral timbers now replaced by longitudinals.

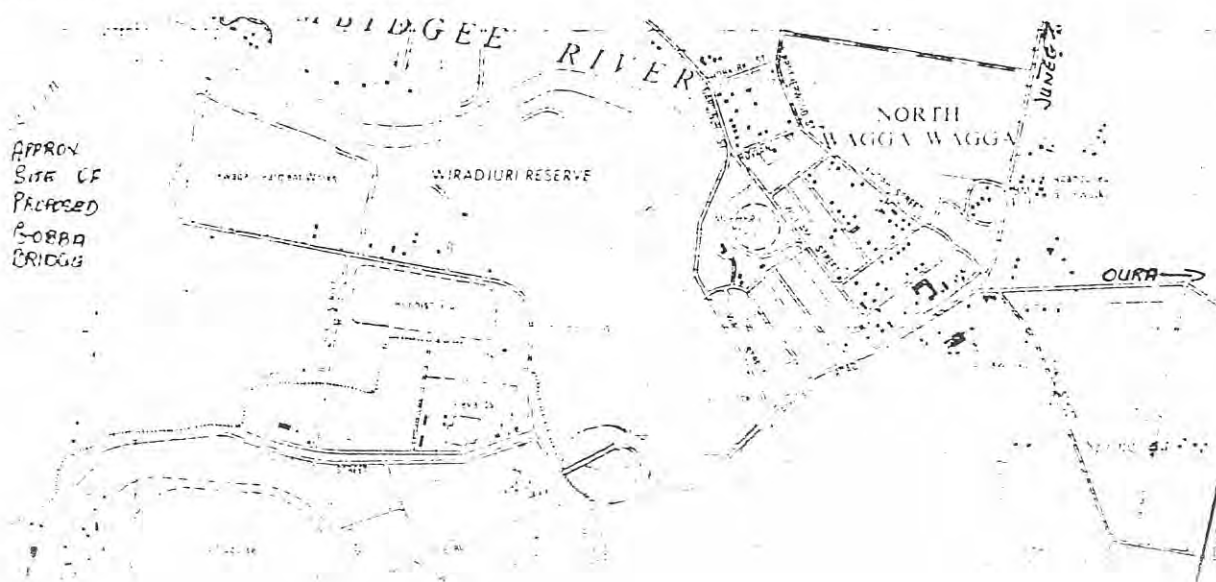
This bridge has served as the only river crossing at Wagga until the Eunony Bridge to the east was built in 1972. It is currently proposed to construct a third bridge to the west diverting traffic away from the Hampden Bridge and the city centre to a new alignment to the west.

The river and river flats are important recreational areas for the city and the present bridge is a visually dominant and historically important feature of this part of the city. It should be retained to provide access for local traffic to the commercial area with..

## Reasons for listing

The Hampden Bridge is possibly the most outstanding remaining example of a Timber Allan Truss Bridge and as such is historically important to the people of New South Wales and culturally significant to the citizens of Wagga Wagga.

Sketch plan and photos  
Attach additional photos  
if any.



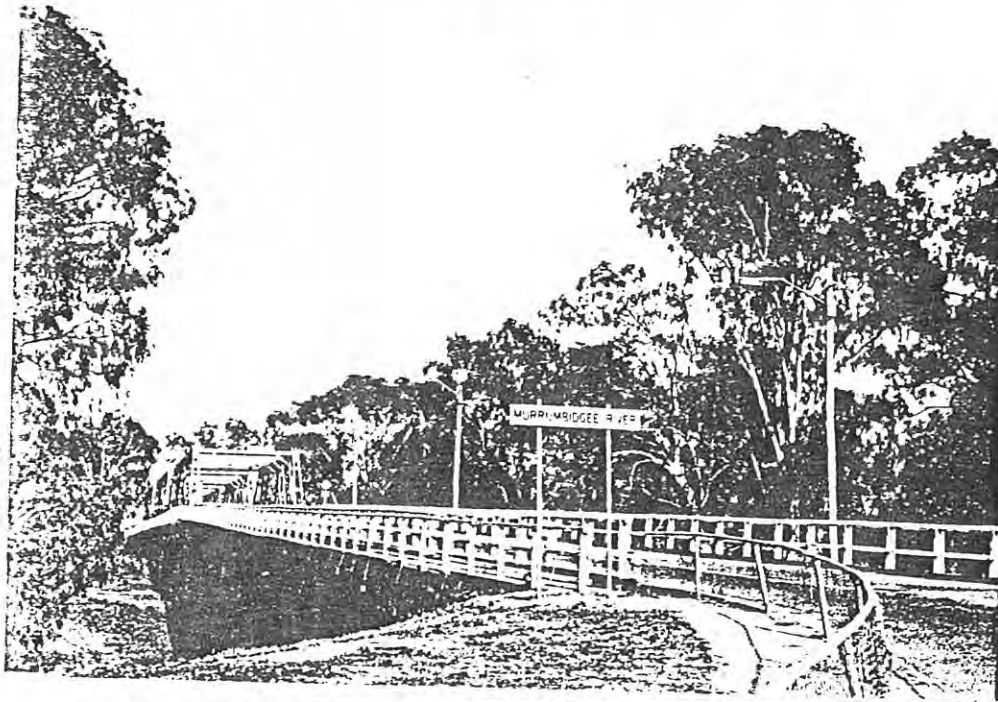
HAMPDEN BRIDGE OVER THE MURRUMBIDGEE RIVER, WAGGA WAGGA:

DESCRIPTION (CONTINUED)

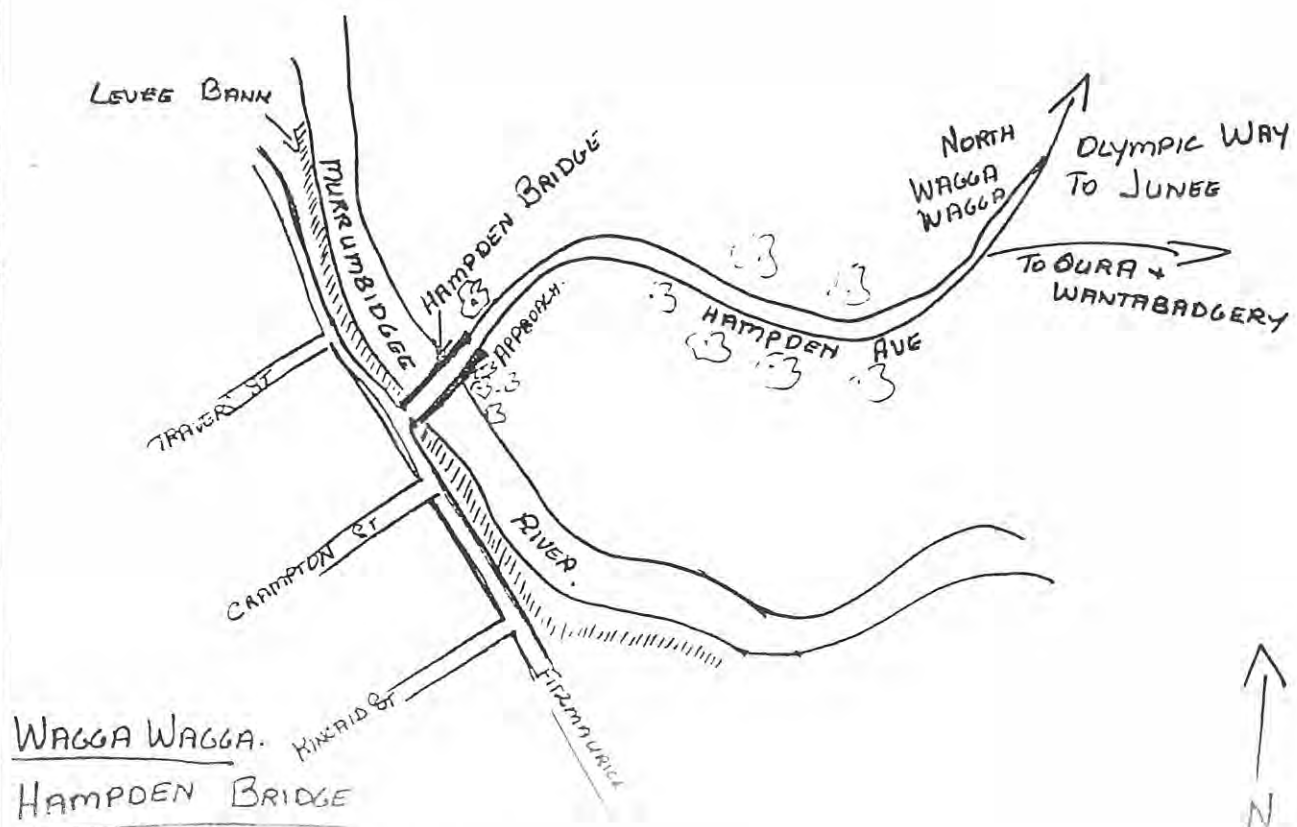
continuing regular maintenance.

General maintenance annually carried out by Department of Main Roads includes painting of superstructure and re-surfacing of carriageway and deck. As a result the general condition is good.

Demolition may follow the construction of the Gobba Bridge to the west of the Wagga Wagga City Council is unwilling to assume responsibility for the continuing maintenance required for this bridge to provide a crossing for local traffic.



Sketch plan of Site



43 -  
Wagga.  
The National Trust  
of Australia (New South Wales)



*Warrumbungle R. (over)* *Hampden Br.*  
**NATIONAL TRUST**

Observatory Hill  
Sydney NSW 2000

GPO Box 518  
Sydney NSW 2001

Telephone (02) 258 0123  
Fax (02) 251 1110

M/railways

21st July 1991

Mr T Paterson  
Connell Wagner (NSW) Pty Ltd  
PO Box 538  
Neutral Bay NSW 2089

Dear Mr Paterson

RE: MAIN SOUTHERN RAILWAY LINE, WAGGA WAGGA

Thank you for your letter received on the 24th June 1991 regarding the replacement of railway viaducts on the Main Southern Line at Wagga Wagga.

The Trust Classified the Hampden Bridge in 1984 and is considered to be historically significant and an outstanding example of a Timber Allan Truss Bridge.

The Trust's Industrial Archaeology Committee would be happy to comment on any proposals in relations to this matter.

Yours sincerely

Stephen Davies  
Director Conservation

encl.

## THE NATIONAL TRUST OF AUSTRALIA (NEW SOUTH WALES)

## ROADS AND TRAFFIC AUTHORITY

## BRIDGES SUB-COMMITTEE

MINUTES of meeting BSC/54 held at 4 pm Thursday, 9 August 1990  
at the Council Room, National Trust Building, SYDNEY.

6. HAMPDEN BRIDGE, MURRUMBIDGEE RIVER AT WAGGA WAGGA

Major repair work is proposed for this bridge. It was suggested that, in view of the envisaged future reclassification of that part of the road on which this bridge is located, with the possible transfer of ownership of the bridges, that consideration be given to requesting a permanent conservation order on the bridge. It was further discussed that it may be appropriate for the RTA to make this nomination and that such a nomination should be accompanied by the preparation of a conservation plan.



MINUTES OF THE RIVERINA REGIONAL COMMITTEE OF THE NATIONAL TRUST (N.S.W.)  
HELD AT G. BENEDYKA'S, KINKAID STREET, WAGGA WAGGA, 11th OCTOBER, 1989.  
8.00 P.M.

ATTENDANCE. E.Lowe, G. & S. Benedyka, B. & R. Taylor, D. Lennon, P. & J. Whiting, M. Gorman, B. Stroud, G. Burch.

APOLOGIES. J. Morrow, A. Paterson, J. & M. Webb.

New membership lists have arrived.

Development Applications. Changes to 10 Simmons Street & 27 Flinders Street are quite in keeping with their surroundings so we shall make no objection.

N.T. Booklet, Gates & Fences, has been published and it was decided to purchase a copy for the City Library.

Kentucky Fried Food Outlet. There will be a public meeting about this on Thursday 12th. G. Benedyka will speak. All members are urged to attend.

Threat to Hampden Bridge. An article appeared in the Riverina Leader on 11th October about Council's plans to demolish all but the existing steel supports & to maintain the trusses "for aesthetic reasons" replacing the wooden bridge with concrete decking.

Concern was expressed that this Wagga Wagga landmark, classified by the National Trust, might be destroyed.

It was resolved that we write to the Council, The Leader, and Mr. Trueman, Chairperson of the Engineering Heritage Committee of the Institute of Engineers Australia about the threat to the bridge. If necessary, after we have received Council's reply, we will contact the Heritage Council with a view to asking for a Conservation Order to be placed on the bridge.

Carcoar Visit. We will meet at the Cowra P.O. at 11.30 A.M. Saturday, 21st October. On Saturday we will look at Cowra & district & continue to Blayney where we will stay at the Goldfield Motel. Sunday we will look at Carcoar.

\* Next Meeting. November 29th. Education Centre at 8.00 P.M. This will be our final meeting for 1989 so bring along something to celebrate with at supper.

\* P.S. At our Cowra/Carcoar/Blayney visit it was decided to have our next meeting on Sunday 26th Nov. at the Hotel Shirley, Bethungra. Meet at 12 noon for meeting/lunch/christmas "breakup party". (Cost approx \$7 for "special menu" lunch. Please phone George 21335 to confirm numbers.

# PRESERVE OR DESTROY?

A dispute concerning the future of Wagga Wagga's Hampden Bridge is about to come to the boil.

Wagga Wagga City Council Engineer, Laurie Fromholtz, and one of Australia's leading bridge engineers, Mr E. G. Trueman, strongly disagree on the future of the bridge.

Mr Trueman has gone as far as requesting that the bridge be given an immediate Conservation Order to preserve it for posterity.

Mr Fromholtz in turn is gravely concerned at the ongoing maintenance costs which he believes will be "very substantial."

Following the completion of the long awaited Gobba Bridge, the Hampden will revert to the control of the Wagga Wagga City Council. Annual maintenance figures of

Mr Fromholtz's solution is to use the existing steel supports of the bridge and add a concrete decking. If necessary the existing truss supports could be retained for aesthetic purposes only.

But the suggestion has been condemned by Mr Trueman.

Mr Trueman is Chairman of the

Mr Trueman said his Heritage Committee was extremely concerned at the Wagga Wagga City Council's proposal.

In his letter he said:

"The (Hampden) Bridge is one of the most important timber truss bridges remaining in NSW.

"It was the first of the large span, overhead braced truss bridges to be built and was the

We recommend that the bridge be given an immediate Conservation Order in order to prevent any action that would destroy one of Australia's most important items of engineering heritage.

between \$100,000 and \$300,000 have been suggested.

"I don't know the actual costs, but I do know that for this single bridge they will be more than the City Council's current annual bridge maintenance budget," he said.

Engineering Heritage Committee of the Institution of Engineers, Australia, and author of a Department of Main Roads Book on the maintenance of timber bridges.


In a letter sent recently to the Heritage Council of NSW,

subject of a paper given to the Institution of Civil Engineers in 1897 by the designer, Percy Allan, who is accepted as the greatest timber bridge engineer in the history of the State.

"The bridge is classified by the National Trust and the Institution of Engineers, Australia.

"There is a suggestion by Council that the maintenance costs on the existing bridge would be excessive, and that labour for repairs would not be available.

"Council seem unaware that there have been recent developments in timber preservatives that can ensure a virtually infinite life for structures

THE RIVERINA
18,152


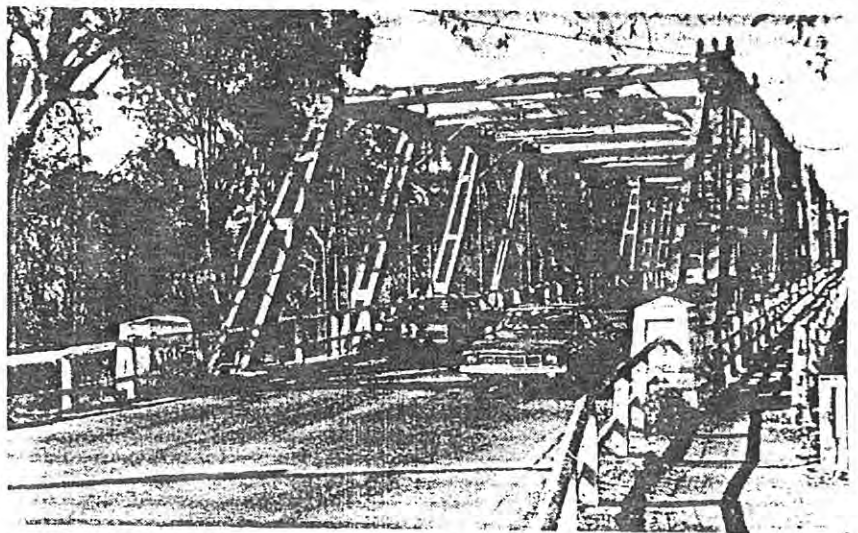
## Leader

Wagga Wagga's Community Weekly Newspaper

114 FITZMAURICE ST, WAGGA WAGGA, N.S.W., 2650. Phone: (069) 215211  
HOME DELIVERED FREE (15c at Newsagents) Fax: 216687

CELEBRATING 11 YEARS OF PUBLICATION

Wednesday, October 11, 1989 24 PAGES



Wagga Wagga's Hampden Bridge will celebrate its 100th birthday in 1995. The future of the bridge is very much in the balance.

constructed from Australian hardwoods, without great expense.

"These preservatives are now in use by the pole industry, and have been adopted by the RTA (ex DMR) in their Maintenance Manual for Timber Bridges.

"We believe that the bridge is of National cultural significance, and should be maintained in service as the only satisfactory form

of conservation for a bridge.

"With the adoption of correct maintenance procedures, the bridge should last beyond the foreseeable future with less cost to the community than the capital expense of a new bridge.

"There is a proposal by Council to incorporate the trusses as non structural elements in a new bridge.

"This is not acceptable, as it effectively destroys the significance of the bridge.

"We recommend that the bridge be given an immediate Conservation Order in order to prevent any action that would destroy one of Australia's most important items of engineering heritage," Mr Trueman wrote.

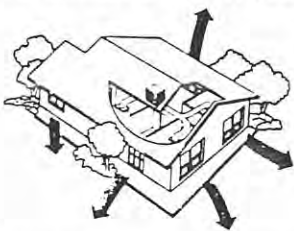
Approval in principle has already been given

by the City Council to substantially change the structure of the bridge.

City engineers are currently working on the final plans to enable a submission to be put to the Government for funding.

Discussions concerning the additional Council funding needed have yet to take place.

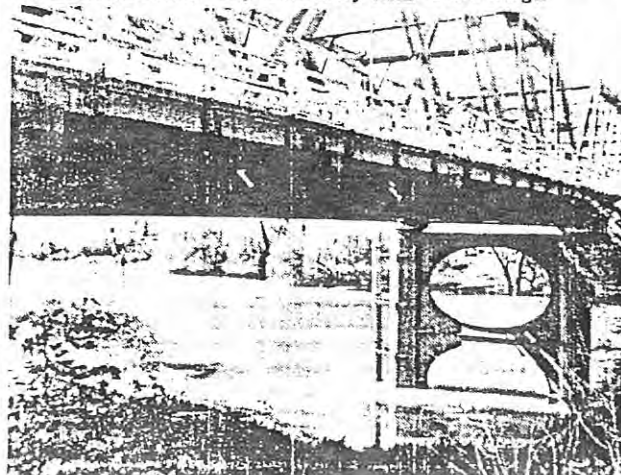
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The City Council is suggesting retaining the bridge supports to build a concrete replacement.

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THE RIVERINA LEADER  
Wagga Wagga N.S.W., Weekly

Date

1 Nov 1989

NEVILLE JEFFRESS/PIDLER PTY. LTD.

# Bridge must not be destroyed

**Wagga Wagga's Hampden Bridge must not be destroyed.**

That's the view of the Riverina Regional Committee of the National Trust of Australia.

The Committee was responding to a front page article in The Riverina Leader on October 11 which outlined plans by the Wagga Wagga City Council to demolish the bridge and use the existing steel supports for a concrete structure.

Excessive maintenance costs were given as the reason however this was disputed by an engineer who specialises in timber truss bridges.

The honorary secretary of the Riverina Regional Committee of

the National Trust, Barbara Stroud, in a letter to the Editor of The Leader stated:

"Members of our committee read with interest the article about the fate of the Hampden Bridge after the Gobba Bridge has been built.

"We are most concerned that the City Council is considering altering the structure of the Bridge so that its original character will be lost.

"It is important that the City Council does not act without obtaining further advice about the cost of preserving the bridge.

"If it is true that there

are ways of preserving wooden bridges "without great expense" and at less cost than the capital expense of a new bridge, then there is no justifiable reason for altering the bridge.

"Too much of Wagga Wagga's architectural heritage has already been demolished or altered.

"Hampden Bridge, as an important part of Wagga Wagga's heritage, must not be destroyed.

"The Bridge replaced an older one which was erected in 1862.

"It was designed by Percy Allen, a leading bridge designer, and was built at a cost of 28,260 pounds.

"It took two years to build, being completed in 1895, and until the Eumony Bridge was completed in 1972, was the only river crossing at Wagga Wagga.

"In July 1984 the National Trust approved the classification of Hampden Bridge, believing that for architectural and historic reasons it merited being placed on the National Trust Register.

"The reasons given for

listing the bridge were as follows:

"The Hampden Bridge is possibly the most outstanding remaining example of a Timber Allen Truss Bridge and as such is historically important to the people of NSW and culturally significant to the citizens of Wagga Wagga."

"We congratulate The

Riverina Leader on publishing this threat to Bridge.

"It is now imperative that the City Council considers more carefully the future of the Bridge."

"It is important that do not lose this historic gateway to our city," letter stated.

43  
The National Trust  
of Australia (New South Wales)



**NATIONAL TRUST**

Observatory Hill  
Sydney NSW 2000

GPO Box 518  
Sydney NSW 2001

Telephone (02) 258 0123  
Fax (02) 251 1110  
Telex TRUST AA74260

RM/06

25th October, 1988

Mr B L Andrews  
Town Clerk  
The Council of the City of Wagga Wagga  
PO Box 20  
WAGGA WAGGA NSW 2650

Dear Mr Andrews,

Re: Wagga Wagga - Hampden Bridge

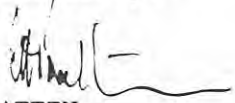
The attention of the National Trust has been drawn to recent media reports which indicate that Council may be giving consideration to making major changes to the structure of the abovementioned bridge, when its ownership passes from the D.M.R. to Council.

As you would be aware, the bridge is Classified by the National Trust and is considered an important item of the State's environmental heritage. For your information I enclose a copy of the Trust's Classification report for the bridge.

While the Trust would not object in principle to modifications to the bridge which were shown to be essential for public safety or operational reasons, the Trust believes it extremely important that any changes to the existing form and fabric of the structure, are carried out in a manner which does not detract from the bridge's significance. If major new elements such as a new deck are proposed, the Trust would recommend strongly that a Conservation Plan should be prepared for the bridge, prior to any final decision about new elements being made.

If Council does propose to proceed with changes to the bridge's fabric, other than normal maintenance, the Trust would appreciate the opportunity to comment on the proposal before a final determination is made. The Trust participates in a Liaison Committee with representatives from the Department of Main Roads and Heritage Council of New South Wales and it is suggested that it may be appropriate to refer plans to that committee as part of Council's consideration of the proposal.

I would be grateful if you would forward a reply to the matters raised above.  
Yours sincerely,

  
C H PRATTEN  
Environment Director

Enclosure

Copy for information: Riverina Regional Committee  
The National Trust of Australia (NSW)

# Many years left in the 'old girl'

By Andrew Reed, a member of Wagga Wagga's Conservation League

**A pile of timber rejected from the Hampden Bridge is growing on the North Wagga Common.**

The majority of this material is still 99 percent sound, as the mode of failure has almost invariably been due to a localised rot caused by the ingress of moisture at joints.

These large baulks of timber have stood the stresses of the bridge for many years.

Without the destructive effects of rot at a few localised but crucial points this timber would still be ready to serve the bridge for a long time.

The proverb about the ship being lost for want of a halfpennyworth of tar was never more appropriate.

The inconvenience which Wagga's commuters are now suffering is substantially the harvest of years of inappropriate maintenance and neglect.

This point is well supported by the condition of the diagonal struts removed from the truss.

Invariably these struts are in excellent condition at the top, where they have been located in a dryer and more airy position. It is only poor maintenance and consequent lack of protection from damp conditions which have caused rotting at the foot.

If the paintwork on a steel bridge had been allowed to deteriorate to the extent of that on the Hampden Bridge, streaming rust would have made the neglect obvious to anyone, the natural durability of

the old timber bridge has been its worst enemy.

The excellent overall condition of the discarded timber bears out the opinion of several independent engineers who commented on the Hampden Bridge at the start of the year; all these experts stated that with reasonable maintenance the bridge could stand for many years.

In 1987 timber bridges were given a new lease of life with the publication of the book "Timber Bridge Maintenance" by the Department of Main Roads.

Technology now has solutions for the problem of moisture induced rot.

Better paints and fungicides and epoxies and silicons to spread the load and exclude moisture, mean that the sort of failure which has necessitated the current round of repairs ought not to happen as often in the future, if the techniques are properly applied.

This point was made by the consultants engaged by the Chamber of Commerce.

The innovative design of the Hampden Bridge was a response to the economic stringency caused by a severe depression in the 1890's.

How ironic that in 1988 when the focus on public spending is no less stringent, there are pressures for the replacement rather than a more cost effective proper maintenance of the bridge.

The construction of a replacement bridge will create an interest bill which is way above the annual cost of proper conservation of the existing structure.

The taxpayer will be the loser.

The Hampden Bridge is the last major timber bridge on the Murrumbidgee River.

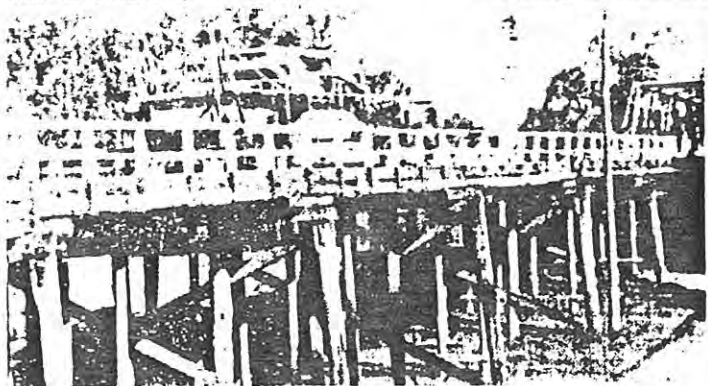
In a tourism conscious city it is a growing asset, a tribute to pioneers and a memorial to the forests which provided the materials for the infrastructure of N.S.W. in the last century.

Recent moves to have the Hampden Bridge listed under the National Estate confirm this view.

When the Gobba Bridge is finally constructed, the long term future of one of the city's historic landmarks can only be assured if the City Council accepts the need for the Hampden Bridge to be maintained in a fully operational condition.

The combination of ordinary maintenance

and preservation which should be available for a piece of living heritage, can ensure that the historic Hampden Bridge will be showpiece of the City.



THE NATIONAL TRUST OF AUSTRALIA (NSW)/DEPARTMENT OF MAIN ROADS

BRIDGES SUB-COMMITTEE

17. WAGGA WAGGA - HAMPDEN BRIDGE ACROSS MURRUMBIDGEE RIVER

The DMR representatives tabled a letter received from the Wagga Wagga Conservation League concerning the Hampden Bridge. The letter expressed concern that the existing bridge should not be allowed to deteriorate while a new bridge was under construction. Mr Wedgwood indicated that major repairs were now due on the existing bridge and would be carried out in the near future.

The National Trust representatives emphasized that it was essential in such cases to continue maintenance until the end of the working life of the bridge concerned, so that its long term retention would not be prevented by unnecessary deterioration of its fabric.

1. A C/141

20 6 84

14. WAGGA WAGGA - HAMPDEN BRIDGE OVER THE MURRUMBIDGEE RIVER

A listing proposal prepared by the Trust's Riverina Regional Committee was tabled. The bridge has been recommended for classification by the Bridges Sub-Committee.

It was RESOLVED to recommend CLASSIFICATION.



R M

## THE NATIONAL TRUST OF AUSTRALIA (NEW SOUTH WALES)

INCORPORATED BY ACT OF PARLIAMENT

### RIVERINA REGIONAL COMMITTEE

P.O. BOX 319, WAGGA WAGGA, 2650  
TELEPHONE: (069) 21 4265 - 21 1216

7th May, 1984.

11 MAY 1984

Mr P.J. James,  
Executive Director,  
National Trust of Australia (N.S.W.),  
G.P.O. Box 518,  
SYDNEY. 2001.

WAGGA WAGGA, HAMPDEN BRIDGE over the MURRUMBIDGEE RIVER.

Dear Peter,

A listing proposal for the above bridge has been prepared because our committee is concerned for the long term future of the Hampden Bridge. The lengthy campaign for a new bridge downstream to the west includes many references well accepted by the general public that the present bridge is impractical, potentially dangerous and too costly to maintain - the usual story!

We see the need for a new bridge but feel that a Classified listing will give credence to the historical and structural significance of the Hampden Bridge and that its potential in maintaining traffic distribution is not ignored.

I do not know who is the assistant to the Trust's Industrial Archaeology Committee but would be obliged if you would pass the enclosed proposal to the appropriate person.

I hope you are keeping well.

With kind regards,

Jill M.  
Research Officer.

# **THE WAGGA WAGGA TIMBER BRIDGE, NSW**

**BY PERCY ALLAN M.I.C.E.  
INSTITUTION OF CIVIL ENGINEERS Vol 128 (1897)**

### "The Wagga Wagga Timber Bridge, N.S.W."

By PERCY ALLAN, ASSOC. M. INST. C.E.

(Paper No. 2994.)

To replace the timber bridge over the Murrumbidgee River at Wagga Wagga, Fig. 1, Plate 5, which, after a life of thirty-three years, was found to be beyond repair, it was decided in 1892 to erect a new bridge, with larger river spans, to avoid the rafting of timber which occurred in time of flood with the small 70-foot spans in the old structure. Tenders were invited for an iron bridge, but, the cost proving excessive, the Engineer-in-Chief for Public Works, Mr. Hickson, M. Inst. C.E., determined to erect a timber structure, and approved the Author's design for a truss bridge, with a larger floor space per span, 3,165 square feet, than any other timber structure erected in the Australian Colonies. In this bridge full advantage has been taken of the abundant supply of good hardwood which the colony possesses. The flooring is of tallowwood, an even-grained timber, free from gum veins, and the best colonial hardwood for the purpose, having a life, under similar conditions to those at Wagga Wagga, of about thirteen years. The floor beams, stringers and truss-work are of ironbark, the truss members being sawn free from heart and sapwood, to ensure mature and sound timber. The average of a number of tests shows this most favoured of Australian hardwoods (for structures exposed to the weather) to have a tensile strength of 8 tons per square inch, a crushing strength of  $4\frac{1}{2}$  tons per square inch, and a shearing strength along the grain of 1 ton per square inch; whilst its durability may be inferred from the fact that some roughly constructed bridges have in some cases attained a life of over fifty years, many over thirty-five years, and but few less than twenty-five years. A prolonged life may, therefore, be anticipated for bridges of more mature design, in which greater attention is paid to the inspection of timber, and more care taken in construction.

The truss spans are designed to carry a distributed live load of

9½ tons on a pair of wheels. The wind-pressure allowed for is 56 lbs. per square foot on the exposed surfaces of curbs, stringers, and ends of planking, and on twice the area of the handrails, ends of transverse girders, top and bottom chords, braces and verticals, the whole being regarded as a uniform moving live load. The colony is subject to violent gales, a remarkable one being the Dandenong gale in September, 1876, during which a velocity of 153 miles per hour, equal to a pressure of 117 lbs. per square foot, was recorded at the Sydney Government Observatory; but such phenomenal pressures extend only over small areas. Many of the existing structures throughout the colony would not now be standing had they ever been subjected to pressures approaching that allowed for in the Wagga Wagga bridge, which may be regarded as somewhat in excess of actual requirements.

The bridge was opened for traffic on the 11th November, 1895, and consists, Figs. 2, of six timber trusses resting on cylindrical iron piers and a concrete abutment, forming three spans, each 110 feet 3 inches long, and nine approach spans each 35 feet long. The carriageway is 24 feet 4 inches wide, whilst one 4-foot 6-inch footway is arranged for on the up-stream side of the bridge. The comparatively large carriageway is necessitated by the requirements of the wool traffic which crosses the structure, a loaded wool-wagon measuring 11 feet 6 inches over all. The trusses, Figs. 3, stand 27 feet 1 inch apart from centre to centre, and are connected at the top and bottom by a system of lateral bracing, consisting of timber transverse struts and wrought-iron diagonal tie-rods; angle- and portal-brackets being provided in the top lateral system. Each truss is formed of wrought-iron vertical suspension rods, diagonal timber struts and timber top and bottom chords, arranged in seven panels. The trusses are 21 feet deep between the centres of triangulations, fully providing for a loaded wool-wagon, which requires 17 feet 6 inches head room.

To prevent the lodgment of water, open top and bottom chords, consisting each of two timbers cut free from heart, and spaced 6 inches apart, were adopted, thus permitting of the easy renewal of these important members, which are also always accessible to the brush. The joint in each flitch in the bottom chord is effected by means of two 14-inch by  $\frac{1}{2}$ -inch wrought-iron plates placed on each side of the flitch stook. On each of these plates, four wrought-iron strips, 14 inches deep by 3 inches wide and  $1\frac{1}{2}$  inch deep, are riveted and are let tightly into the timber, being designed

50 tons, and as the four strips have a total bearing area of 84 square inches, a factor of 8 is provided against crushing; whilst for shearing along the grain a minimum factor of 13 is provided, irrespective of any assistance obtained from the bolts passing through the plates and fitch. The diagonal braces are formed each of two sawn timbers free of heart, bowed to prevent warping and twisting, and connected together by bolts and hardwood distance-pieces. The horizontal thrust from the braces is taken by castings, having lugs  $1\frac{1}{2}$  inch deep let into the chords.

In most of the American Howe trusses, counterbraces are introduced, to give lateral stiffness to the main braces. The great strength of ironbark, however, rendered this unnecessary in the Wagga Wagga bridge, and counters have been provided only in the centre bay, where the analysis showed them to be required. The deck consists of sawn transverse planking spiked to longitudinal stringers, seated on the lower lateral wind-struts. The lower lateral struts are adzed down on their upper surfaces to give a 2-inch camber in cross-section of the deck, whilst the centre line of the strut is placed in the same plane as the centre line of the bottom chord. The ends of the lateral strut are secured to the bottom chords by wrought-iron brackets; to these are attached the lower lateral diagonal tie-rods, the centre-lines of which—if produced—would intersect at the centre of bottom chord. The triangulation lines of the wind-bracing and truss-members thus intersect at a common point, avoiding all bending stress in the bottom chord. The lateral struts are tightly dapped 1 inch over nine sawn packing-blocks resting on the floor beams; these blocks not only raise the lateral struts to the same plane as the centre line of the chord, but also equally distribute the whole load over the pair of floor beams at each apex. As the width of the two floor beams at each apex is 2 feet 5 inches, it was impracticable, without fouling the braces and suspension-rods, to support them on the upper edge of the bottom chord; they are therefore suspended from the chords, each pair by sixteen beam-hangers,  $1\frac{3}{4}$  inch in diameter, passing on each side of fitches of the bottom chords.

By the adoption of this floor system, the shock from passing loads was reduced by the lateral strut and distributing-blocks acting as a cushion; whilst the shortness of the beam-hangers permitted of a large allowance being economically made for dynamic action. Again, as only direct stresses had to be provided for, an appreciable saving in material was effected.

Any member of the bridge can be renewed separately. The top and bottom chords, consisting of two pieces, the suspension-rods and beam-hangers can be removed and re-arranged to throw the whole weight on one fitch, there being no stress on the remaining fitch; any member of the top and bottom chords can be replaced with sound timber. By loosening the suspension-rods and inserting temporary struts, the braces can be renewed; whilst the removal of the floor beams, stringers and decking is obviously a simple matter. The minimum factor adopted in the trusses is 7 for the stresses due to combined dead and live loads. This may appear somewhat liberal, but the ultimate strength of ironbark having been taken from tests of small specimens of picked timber, less relative strength is to be anticipated in large scantlings. Again, as the fitches were sawn, the grain will run more or less across the line of the stick; and, as defects in timber are liable to escape even the closest inspection, it is necessary to make a wide allowance to cover such contingencies.

The cylinders, Figs. 4 and 5, were sunk under air-pressure to a gravel foundation, and, after the material within them was excavated, were filled with cement concrete. The maximum pressure on the foundation when the bridge is fully loaded is  $5\frac{1}{2}$  tons per square foot, neglecting any supporting-power derived from buoyancy or skin-friction. The piles in the platform forming the foundation for the concrete abutment were "blunt pointed" and driven without shoes to a depth of 20 feet; the set, for the last three blows of a 20-cwt. ram falling 10 feet, being 1 inch. The maximum load carried on a pile-head is 25 tons when the bridge is fully loaded. With the exception of the cylinder plates and a few sections of L-bar, all the wrought-iron bars were rolled from scrap at the Lithgow Ironworks, 97 miles distant by rail from the Atlas Company's works in Sydney, where all the ironwork was manufactured, being then forwarded by rail to Wagga Wagga, a distance of 310 miles. The whole of the timber was brought from the northern rivers of the Colony to Sydney, 150 miles by sea, and thence by rail, 310 miles, to Wagga Wagga.

The cost of the superstructure of one 110-foot truss span, erected complete in position, was £1,300, whilst the total cost of the bridge and earthwork approaches was £14,200.

The Paper is accompanied by six drawings from which Plate 5 has been prepared.

WAGGA WAGGA TIMBER BRIDGE N.S.W.

Fig. 2.



GENERAL ELEVATION.



PLAN.

Scale for Fig. 1, 1 inch = 100 feet.  
Fig. 2, 1 inch = 50 feet.  
Fig. 3, 1 inch = 10 feet.

Fig. 1.

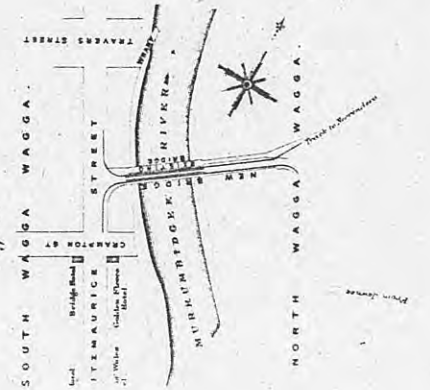
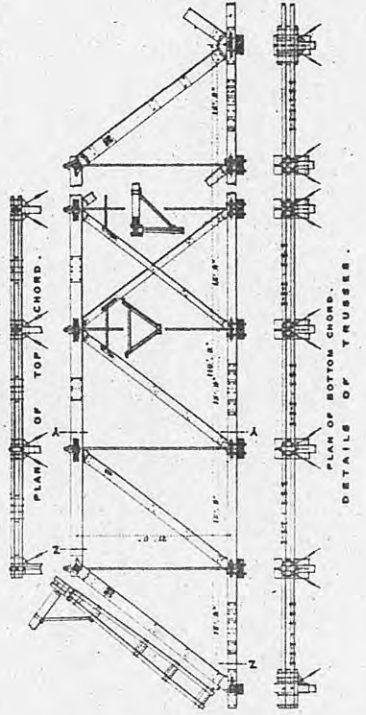
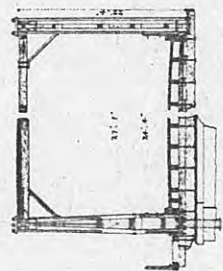


Fig. 3.



PLAN OF TOP CHORD.  
PLAN OF BOTTOM CHORD.  
DETAILS OF TRUSSES.

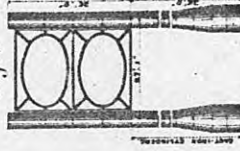


CROSS SECTION AT Y.



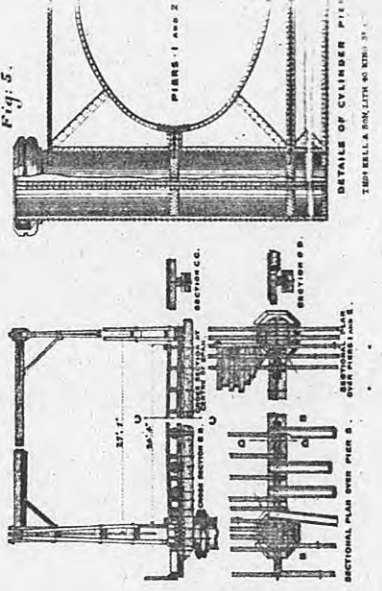
PLAN AT ABUTMENT.

Fig. 4.



PIERS.

Fig. 5.



DETAILS OF CYLINDER PIER.  
PIERS 1 AND 2.  
SECTIONAL PLAN OVER PIER 3.  
SECTIONAL PLAN OVER PIER 4.  
SECTIONAL PLAN OVER PIER 5.

# **TIMBER BRIDGE CONSTRUCTION IN NEW SOUTH WALES**

**BY PERCY ALLAN, ASSOC. M.Inst.C.E.  
ROYAL SOCIETY OF NSW, 18 SEPTEMBER, 1895**

# TIMBER BRIDGE CONSTRUCTION IN NEW SOUTH WALES.

By PERCY ALLAN, Assoc. M. Inst. C.E.

[With Plates 1-8.]

[Read before the Engineering Section of the Royal Society of N. S. Wales,  
September 18, 1895.]

THE necessity for the economical designing of timber bridges in the Colony of New South Wales, may be gauged from the fact, that in the last ten years some 680 timber structures have been erected at a cost of £634,000, so that any economy in a type design means a very large saving in the annual expenditure of the Colony.

For many years *Plate 1*, was the type of truss for 65 feet, 75 feet, 90 feet, and 100 feet spans. The defects in this design may be briefly summarised—weakness in suspension rods, no means of taking up slackness in braces, caused by shrinkage of timbers, and tendency of top chord to incline inwards owing to want of lateral stiffness.

Although this type of truss has for many years carried the traffic without accident, yet in view of the increase in settlement and the greater risk of the structures being subjected to heavier loads, it was thought desirable in 1886 to adopt the design shown in *Plate 2* for 65 feet, 75 feet, and 90 feet spans.

These structures were designed for a distributed live load of 84 lbs. per square foot of roadway and a traction engine weighing 16 tons, on a 10' 4" wheel base having 9½ tons on the leading wheels.

The improvements in these trusses are the increased sectional area of suspension rods, the providing of means of taking up slackness in braces, increased lateral stiffness imparted to truss

by splicing principals, the introduction of iron in lieu of timber side braces, the more general use of sawn timber free from heart, and the more effective splicing of chord.

In 1893 to replace the 1886 type of truss bridges, Mr. Hickson, M.I.C.E., Engineer-in-Chief for Public Works for New South Wales, approved of the author's designs for new standard type of truss bridges for 70 feet and 90 feet spans, *Plate 3*. The 90 feet span is designed for a traction engine of 16 tons and a distributed live load of 18.8 cwts. per foot run, or  $7\frac{1}{2}$  cwts. per lineal foot more than for the 90 feet truss bridge previously in use.

The truss is divided into nine panels of 10 feet with a depth of 13 feet measured between centres of triangulations, and carries a 15 feet carriageway and two 5 feet footways.

The timber generally employed is tallowwood for the planking and ironbark for the stringers, floor beams and trusses, the timber in trusses being cut free of heart; but in many districts the local timber, with a somewhat shorter life could be used for the planking and stringers.

The flat decks in the old type of bridges, resulted in water lying in pools on the surface of the planks, more especially in the centre of the roadway, where the wear is greatest; 3 inch scupper pipes along kerb line, even if not choked up, are therefore of little service.

To provide against this a camber of  $1\frac{1}{2}$  inches in cross section of deck is provided in the new type of bridge, permitting of the quick escape of water through the large gratings at ends of spans.

Unlike previous designs, 4 inch transverse planking spiked to longitudinal stringers has been adopted, thus permitting of shorter lengths being obtained at a cheaper rate and of their being replaced with less trouble than diagonal planking.

Longitudinal stringers varying from  $10\frac{3}{4}$ " by 5" to 9" by 6" (to give camber in deck), pitched 3 feet apart, are bolted to the floor beams, in lieu of the intermediate floor beams used in all previous designs, effecting a saving in cost, and permitting of the concen-

trating of the loads at the apices; thereby relieving the bottom chords of secondary stress.

In all the old types of trusses, the suspension rods passed through the floor beams, and as the braces were also butted against the floor beams, the renewal of these timbers was rendered practically out of the question.

In the later design, *Plate 3*, the floor beams 15" by 12" spaced 10 feet apart are placed between the suspension rods, admitting of easy renewal, and at the same time saving the expense of boring large holes through floor beams for the passage of suspension rods.

With a view to renewals, the horizontal thrust from the braces is taken up by means of castings, having lugs  $1\frac{1}{2}$ " deep let into the chords, and where two lugs are necessary it will be noticed that the deeper lug is at the back of the casting, so as to distribute the thrust over a larger area and reduce the risk of failure by shearing between the lugs.

The advantage in using castings in lieu of a number of timbers bolted together to form butting blocks for the braces, is the doing away with to a great extent of one of the most troublesome questions in connection with timber bridge work, viz., the lodgement of water. No matter how carefully the timbers may be bolted together and painted, water will, after a short time, find its way between the surfaces with its accompanying ill effects; again, in the endeavour to get a close joint along the exposed surface the butting surfaces will oftentimes be made slightly concave, in such cases when the water does penetrate—there being no escape—the evil will be intensified.

The batter braces, which consist of two  $14\frac{1}{2}$ " by  $6\frac{1}{2}$ " timbers bowed and stiffened with hardwood distance pieces have been substituted for principals; thus reducing the horizontal thrust to such an extent as to permit of the introduction of castings in lieu of the large timber butting blocks, with the heavy bolts, previously necessary.

In most of the American Howe trusses counterbraces are introduced, with a view of stiffening laterally the main braces, however the braces in the truss under consideration are comparatively short, and as columns require no lateral stiffening; counters in the end bays are therefore not provided.

As all the braces in the truss are at the same angle, any shrinkage in the timbers can be taken up by means of the suspension rods; the iron wedges in the 1886 design are therefore not arranged for in this later type of truss.

The main braces are formed each of two timbers 8" by 4½" bowed to prevent warping and twisting and connected together with bolts and hardwood distance pieces, all the timbers being connected to the cast-iron shoes at the top and bottom with 7" bolts.

Formerly it was the practice to have the top chord in one piece 16" by 14" by 42' long, which having to be bored for the suspension rods, rendered renewal very costly, if not impracticable. As one of the objects in designing a new type of truss was to permit of renewals, a chord, consisting of two timbers 14" by 6½" bowed and stiffened with hardwood distance pieces was adopted, thus securing better timber and giving greater stiffness as a column.

The side braces adopted in previous trusses being a source of inconvenience when footways had to be provided, the author decided to design this chord as a column with a varying load, unsupported in a lateral direction; none of the text books however, consulted by the author treated of such a case.

The stress in the top chord of a 90 feet span ranges from 69.3 tons in the centre to 27.72 tons in the end bay.

As the maximum stress extends only over a length of 10 feet of the chord, it would be obviously incorrect to take this stress on a column the total length of top chord, nor could it be assumed that this maximum stress was acting only on a column 10 feet long.

The author therefore has dealt with the case in what he submits, is a practical way of looking at the question.

Starting with the end bay there is a stress of 27.72 tons which extends for the whole length of the chord (70 feet). Taking the least diameter, the ratio of length to least diameter is 48 to 1 and the ultimate buckling strength of a timber column of this proportion, being 2.36 tons per square inch, the area required on the point of buckling would be 11.74 inches, whilst at the ends of the column the area required, when on the point of failure by direct crushing would be 5.87 inches.

Setting up these ordinates and plotting in as a parabola, the area shown on diagram, *Plate 4*, is obtained; in the second bay the stress is 48.51 tons extending for a length of 50 feet—but as part of this stress (27.72 tons), has already been provided for, it leaves only 20.79 tons to be dealt with; taking the ratio of length to diameter this gives a column of the proportion of 36 to 1, requiring an area of 6.77 square inches when the column is on the point of buckling at the centre, and an area of 4.4 square inches when on the point of failing by direct crushing at the ends, the required additional area being shown on the diagram, *Plate 4*.

In the third bay there is a stress of 62.37 tons extending over a distance of 30 feet, 48.51 tons of this stress has already been dealt with, leaving only 13.86 tons to be provided for, proceeding as before, the area shown in green is arrived at; in the middle bay the stress is 69.3 tons extending over 10 feet of which 62.37 tons has been provided for, leaving 6.93 tons to be arranged for.

The whole of the varying stresses having now been dealt with, the heavy dotted black line, represents the total area required when the column would be on the point of failing.

The actual net area of timber provided is 156.16 square inches, *Plate 4*, and as the maximum area required at the centre is only 23.65 square inches, the column has a factor of safety of 6.6 against buckling, irrespective of the stiffness imparted by the splaying of the feet of braces.

The bottom chords of the 1886 type of trusses for 90 feet spans 14" by 18" were built up of four 14" by 4½" flitches, planed on all surfaces to ensure good butting, the whole being drawn up with ¾ inch bolts. This is a costly and undesirable design of chord, offering as it does, after a few years, an entrance for water between the flitches, causing decay, which is especially serious on account of the design of truss being such that the bottom chord cannot be renewed, thus necessitating in some cases the replacing of the whole structure, which under other circumstances—with a few new flitches—might have lasted for several years longer.

Again, some of the flitches are 53' 6" long and, having to be free of heart and sapwood, are difficult to obtain, and this oftentimes occasioned delay in the erection of the structures, the simple-minded sawmill proprietor supplying all the short and profitable sizes in the bridge, and then pleading inability to supply the more costly flitches.

The bending stress in the bottom chord of the new truss having been eliminated by the omission of intermediate floor beams, only a direct stress has to be provided for, resulting in a considerable reduction in the sectional area of the bottom chord, which consists only of two flitches 12" by 5" placed 6 inches apart, thus being always accessible to the brush, and permitting of the renewal of these important members; again, the longest flitch is only 36 feet, a length easily procurable.

Perhaps the most important connection in a timber truss is the bottom chord joint.

Plate 5, fig. 1, shows the cover adopted for the very old types of truss, which can at a glance be seen to be of little assistance in making up the loss of section caused by the joint in the chord.

Plate 5, fig. 2, shows the cover used in the 1886 type of truss; this is a much superior connection, but is expensive and difficult to fit.

Plate 5, fig. 3, shows the cover adopted for the new type of truss.

As the two flitches in the bottom chord are independent of one another, the whole stress in each flitch has to be taken by the two 12" by ½" wrought-iron plates placed on either side of the beam; on each of these plates four wrought-iron strips 12" deep by 1½" wide by 1" deep are rivetted; these strips are let tightly into the timber and are designed to take up the whole of the stress, and as the stress in each flitch is 31·18 tons and there are four strips giving a total bearing area of 48 square inches, the crushing strain is only 65 tons per square inch, thus giving a factor of safety of 7½ against crushing, whilst for shearing along the grain a minimum factor of 15 is provided.

Following American practice, the bolts passing through cover plates are not in any way relied upon, being simply provided to keep the plates up to their work, however as the bolts had to be provided the author determined to obtain the benefit of them, and arranged for the bolts to be turned and passed through drilled holes in the plates.

The above joint has also met with the approval of the Engineer-in-Chief for Railways and has been adopted for some of the proposed bridges on the Narrabri-Moree line, whilst in some of the later American railway bridges it has proved successful, despite the fact of it being necessary in some of these pine bridges to arrange for fitting in, eight strips in each plate, instead of four as shown in Plate 5.

With this joint, requiring as it does only a straight cut, no difficulty is found in obtaining an almost perfect bearing with ironbark timber, and so far in the 146 joints in the bridges already erected in this Colony, no trouble has been found in effectively making this connection.

The suspension rods, which in the author's design of truss have a minimum diameter of 2" and 1½" respectively, are placed on either side of floor beams, and pass through the space between the chords, thus saving the boring of holes through chords and floor

beams, and permitting of easy removal in connection with the system to be adopted in renewing chords.

One of the features of the new type of truss is, that any member can be renewed without staging from below, a matter of importance when deep gorges or fast running streams have to be crossed. Briefly stated, the top and bottom chords being in two pieces, the suspension rods are removed and re-arranged so as to throw the whole weight on one flitch; there being no strain on the remaining flitch, any member of the top and bottom chord can be replaced with sound timber; and by slackening the suspension rods and inserting temporary struts, any of the braces can be renewed, whilst the renewal of the cross girders is obviously a simple matter.

In the superstructure of one of the new 90 feet spans carrying a 15 feet deck, there is 500 cubic feet less timber than in the 1886 type of truss, which, in conjunction with the greater ease in framing together (notably in the bottom chord, where no fitting is required) the fewer bolt holes to be bored and the short lengths of timber employed, effects a saving of over £100 in each 90 feet span.

The economy is more marked when it is considered that the old trusses were designed to carry a 15 feet carriageway, whereas the new trusses are designed to carry two 5 feet footways in addition to a 15 feet carriageway. Thus it will be seen that the later design of truss bridge offers greater facilities for traffic at a much reduced cost.

The piers carrying truss bridges vary in accord with local circumstances; one of the heavy type is that shown in Plate 6, consisting of nine vertical piles 12" by 12" arranged in groups of four under heels of trusses, also one short vertical pile upstream and two short vertical piles downstream, carrying up and downstream struts. The pier is stayed with wales and braces 12" by 6" and internal compression struts 12" by 12" seated on hardwood chocks secured to piles with bolts, the chocks being set end on to do away with shrinkage, the previous system of seating butting

blocks on the wales not being satisfactory, the blocks shrinking away from the struts, resulting in a slackness in the bracing.

At Glennies Creek, near Singleton, the superstructure of one of the 90 feet spans cost, erected in position, £450, whilst in the same bridge a pier of the design above described 28 feet 4 inches high from bottom waling to capwales, driven about 16 feet to rock, cost £200. The timber for this bridge was brought from Cape Hawke to Newcastle by sea 61 miles, thence forward by train to Singleton 49 miles, thence by road 9 miles, or a total carriage of 119 miles.

Late in the year 1892, it was decided to erect a new bridge over the Murrumbidgee River at Wagga Wagga. Designs were submitted for a light iron lattice girder bridge, carrying a timber deck resting on iron cross girders, but the amount available being insufficient, the author's design for a timber truss bridge was decided upon, and a contract for construction let to Mr. S. Stokes on 4th October, 1893, at schedule rates, totalling £12,604.

As this bridge is now nearing completion, and, reckoned by the floor space per span (3,165 square feet) is by far the largest timber structure yet attempted in the Colony, a short description may be of interest:—The bridge consists of six timber trusses, resting on iron cylinder piers and concrete abutments, forming three spans each of 110' 3" centres, also nine approach spans each of 35 feet. The trusses stand 27' 1" apart, centre to centre, and are connected by a top and bottom system of lateral bracing, angle and portal brackets being introduced in the top system. Each truss contains seven panels of 15' 9" and being 21 feet deep between centres of triangulations enables full provision to be made for a loaded wool waggon, which requires 17' 6" head room. The truss spans are designed to carry a distributed live load of 1·2 tons per foot run, or a concentrated load of 16 tons.

The carriageway is 24' 4" whilst one 4' 6" footway is arranged for, so that the requirements of the wool traffic will be fully met; a wool waggon measuring 11' 6" when loaded and 6' 6" when empty.

The wind pressure allowed for is 56lbs. per square foot, on the exposed surfaces of kerbs, stringers, and ends of planking, and on twice the area of the handrails, ends of girders, top and bottom chords, braces and verticals, the whole being taken as an uniform moving load.

Whilst the author is aware that on the occasion of the Dandenong gale, September, 1876, the wind is recorded at the Sydney Observatory to have attained a velocity of 15.3 miles per hour, equal to a pressure of 115lbs per square foot, yet the author considers there would be no justification for assuming that such a phenomenal pressure would extend over such a large area as that occupied by such a bridge as that under consideration, and in support of this opinion, points to the existing structures throughout the Colony, few if any of which would be now standing if ever subjected to anything approaching even the pressure allowed for in the Wagga Wagga bridge.

The minimum factor of safety adopted for timber in the trusses is 7 for the stresses due to combined dead and live loads. Although this factor may appear to be somewhat liberal, yet it must be borne in mind that the ultimate strength of ironbark has been taken from tests made on small specimens of picked timber, and that a reduction in strength is only to be anticipated in large scantlings, again the flitches being sawn, the grain will run more or less across the line of the sticks, and as defects in timber are so liable to escape even the most severe inspection, it is necessary, in the opinion of the author to make a liberal allowance to cover such contingencies.

The floor system adopted in this bridge presents some novel features, which, so far as the author is aware, have not previously been adopted in any structure in any part of the world. (See *Plate 7*). The main points kept in view were:—

- 1st. The necessity of having a camber in deck to permit of the quick escape of water.
- 2nd. The desirability of having a lower lateral system of windbracing, so arranged that the triangulation lines of the

windbracing and the triangulation lines of the truss members would intersect at a common point in the bottom chord.

3rd. The distribution of the load, so as to get each pair of the floor beams to act as one.

4th. The necessity of concentrating the loads at the apices, as, with the Section employed, two 14" by 7" timbers, no additional stress was permissible in the bottom chords.

The deck adopted consists of 4" transverse planking spiked to 12" by 6" longitudinal stringers, seated on the lower lateral struts. The lower lateral strut is 12" wide by 8" deep at centre, adzed down on top surface to 6 inches at ends (to give camber in deck), the centre line of strut being placed in the same plane as the centre line of the bottom chord. The ends of the lateral strut are secured to bottom chords by wrought-iron brackets, and to these brackets are attached the diagonal tie rods, the centre lines of which, if produced, would intersect at the centre of bottom chord; the triangulation lines of the wind-bracing and truss members thus intersecting at a common point and avoiding all bending stress.

The lateral struts are tightly dapped one inch over nine 12" by 4" sawn packing blocks 2' 5" long, resting on the floor beams.

These blocks not only pack the lateral struts up to the same plane as the centre line of chord, but what is of just as much importance, equally distribute the whole load over the pair of floor beams.

With a panel length of 15' 9" and a span of 27 feet the resulting load is so great as to necessitate the use of two floor beams, each 14" wide by 16" deep, spaced one inch apart (to permit of a current of air and avoid boring for stringer bolts), and connected together with 11  $\frac{7}{8}$ " bolts passing through one inch cast-iron distance washers.

As the overall width of these two floor beams is 2' 5" it was impracticable, without fouling the braces and suspension rods, to rest them on the upper edge of the chord. They are therefore

suspended from the chords by sixteen beam hangers  $1\frac{3}{4}$  inches diameter passing on either side of the flitches of chords.

The author is of opinion that for timber railway bridges of large span, the floor system above described offers some advantages, inasmuch as shock from trains would be reduced by the lateral strut and distributing blocks acting as a cushion; whilst the beam hangers being so short a large allowance could economically be made for dynamic action, which action would be materially lessened by the time the main suspension rods were reached.

In connection with the construction of timber bridges, the financial aspect of the question is of the utmost importance. Like all engineers, the author would prefer (if economy had not to be considered) to construct metal bridges, but in a new Colony where the trend of the traffic is likely to be diverted by many circumstances, difficult, if not impossible, to anticipate, it would seem preferable in such localities to construct timber structures with a small capital outlay, rather than spend large sums on works of a more permanent character.

For many years there has been a disinclination in this Colony to build other than permanent traffic bridges out of loan funds, yet as harbour works and railway works, in which timber structures, sleepers, fencing, etc., represent no inconsiderable portion, are built out of loan funds, the author submits there is no reason why traffic bridges should not also be constructed out of borrowed capital, provided it can be shown, first, that they are more economical not only in prime cost but in annual charge, and secondly, that provision be made for their renewal or repayment out of revenue.

It may be urged in these days of cheap steel, that it is against the practice of other parts of the world to construct timber bridges, but in what other country could be found timber with a tensile strength of 8 tons per square inch, a crushing strength of  $4\frac{3}{4}$  tons per square inch, and a shearing strength along the grain of 1 ton per square inch; or bridges totally unprotected from the

weather with a life approaching anything like, amongst others, the following:—

Bridge over Cox's River, at Glenroy .....	28 years old.
Bridge over Bell River .....	32 years old.
Bridge over Macquarie River, at Dubbo .....	32 years old.
Bridge over Murrumbidgee River, at Wagga .....	33 years old.
Bridge over Duck River, at Parramatta .....	34 years old.
Bridge over Cudgegong River, at Rylstone .....	34 years old.
Bridge at Berrima .....	35 years old.
Bridge over Murray River, at Albury .....	36 years old.

The first metal bridge in the world, is said to have been erected over the Severn at Colebrook Dale in 1779, this bridge consists of a cast-iron arch of 100 feet span, the structure being thus 116 years old.

Wrought-iron and steel bridges are however of a much later date, and the fixing of the life of such structures, is to a great extent only a matter of conjecture; in connection with this matter Waddell says, "There is no reason why a well-designed iron highway bridge—when properly cared for—should not last for ever." "Under loads which are light and slowly moving compared with those of railway bridges, the iron cannot possibly wear out, and when properly protected from the weather cannot rust."

The author therefore to make everything favorable to the metal bridge in a comparison of its cost, with that of a timber bridge, has assumed the life of the former as infinity; whilst the timber bridge has been taken at only 25 years—a life—it is only reasonable to expect will be much exceeded, with the better type of structure, the more careful inspection of timber, and the greater care in erection that now obtains.

The whole of the timber for the Wagga Wagga bridge was brought from the Northern Rivers to Darling Harbour, about 150 miles by sea, thence by railway to Wagga Wagga 310 miles, or a total carriage of 460 miles.

The contract cost for one timber truss span at Wagga Wagga is £1,300 and the estimated cost of one span of the iron lattice

girder design, complete on bearings was £2,800 (Colonial manufacture). Now, to compare the relative cost of these two bridges on the basis, that the planking in each bridge will require renewal every 12½ years, the remaining timberwork every 25 years and that the ironwork is everlasting, it is necessary to ascertain how much per annum it will take to keep these bridges "trafficable" for ever, in other words to ascertain how much per annum it will cost in each case for interest on the prime cost, tarring, painting, removal of old material and renewing of each portion as it wears out.

Having obtained the annual charge for each bridge, the difference represents the saving effected. The comparison is as follows:—

## ANNUAL CHARGE FOR IRON DESIGN.

Item.	Prime Cost.	Interest.		Renewals.		Sinking Fund to provide for removal and renewal of timber.		Maintenance.	Total.
		Rate	Amount.	Rate	Amount.	Life.	Amount.		
Planking...	£ 180	4½%	£ 8 0	£ 220	12½ yrs.	13 18 2	£ s. d. 13 18 2	£ s. d. 21 2 2	£ s. d. 21 2 2
Stringers...	130	"	5 4 0	£ 170	25 "	4 1 8	" 4 1 8	" 9 5 8	" 9 5 8
Ironwork...	2490	"	99 12 6	Nil.	Infinity	Nil.	Nil.	99 12 0	99 12 0
Painting...	.....	.....	.....	.....	.....	.....	.....	60 0 2	60 0 2
£2800	.....	.....	.....	.....	.....	.....	.....	£140 0 0	£140 0 0
Total annual charge ...									£140 0 0

## ANNUAL CHARGE FOR TIMBER DESIGN.

Item.	Prime Cost.	Interest.		Renewals.		Sinking Fund to provide for removal and renewal of timber.		Maintenance.	Total.
		Rate	Amount.	Rate	Amount.	Life.	Amount.		
Planking...	£ 180	4½%	£ 8 0	£ 220	12½ yrs.	13 18 2	£ s. d. 13 18 2	£ s. d. 21 2 2	£ s. d. 21 2 2
Stringers, trusses, floor-beams and remainder of timber in superstructure	630	"	25 4 0	£ 950	25 "	22 16 3	" 22 16 3	" 48 0 3	" 48 0 3
Ironwork...	490	"	19 12 0	Nil.	Infinity	Nil.	Nil.	19 12 0	19 12 0
Painting...	.....	.....	.....	.....	.....	.....	.....	51 5 7	51 5 7
£1300	.....	.....	.....	.....	.....	.....	.....	£140 0 0	£140 0 0
Total annual charge .....									£140 0 0

Thus it will be seen that there is a saving of £50 per annum in favour of the timber bridge, which has at 4 per cent. interest, a capital value of £1,250. See *Plate 8*.

The author has also designed timber trusses for spans of 130 feet and 153 feet. The latter truss altogether differs from the Wagga Wagga bridge, four fitches instead of two being placed in the top and bottom chords, and as for purposes of renewal a larger sectional area is provided than is actually required for direct tension, the floor beams can in this case be seated directly on the upper edge of the bottom chord.

The fitches of chords being spaced only three inches apart whilst allowing of a free current of air, and room for painting, permits of the adoption of channel iron gird-plates for suspension rods in lieu of the heavy forgings used at Wagga Wagga, whilst the castings are, from the same cause, much lightened.

Again, in the lower lateral system diagonal timbers and transverse tie rods have been arranged for, which is somewhat more economical than the diagonal tie rods used at Wagga Wagga.

In conclusion the author desires to record his acknowledgments to Mr. Hickson, M.I.C.E., for his courtesy in lending models, plans, and photographs to illustrate the several works mentioned in the foregoing paper.

## DISCUSSION

Mr. DEANE said that in a design for a timber bridge, in the first place there was the proportioning of the amount of material in the trusses, and beams to the strain to which they were subjected. That of course should be made as near to theory as possible, although it was hardly possible to strain right up to theory. The different parts should be capable of separate erection, and ought to be put together in a proper manner, for instance, the trusses should be stayed, and should be capable of erection separately; they should be complete in themselves, and braced together before any attempt is made to put on the plat-

form of the bridge. After the trusses are erected then the platform should be added. The old practice used to be on the interlacing principle, leading to something like a Chinese puzzle, and very difficult to deal with in case of renewal. Another point to be considered was the replacement of the separate pieces of the truss, one or other might decay, and they ought to be so fixed that these particular pieces could be easily taken out, and what was of great importance, was the construction of the joints, so that there should be no lodging of water in them, and that they could be examined, and attended to when necessary. With regard to the comparison of the cost of the bridge, the illustration of which the speaker exhibited, with that of Mr. Allan's, the conditions were different, as his was intended for road traffic, and the other for railway purposes. In the road bridge one of the largest items of expense was decking, which the railway bridge was made very much narrower, but having to carry heavier loads was much stronger.

Mr. BURGE—He intended to refer to-night only to the author's comparison between the ultimate cost of timber as against iron or steel in bridge construction. With regard to the cost of the two kinds of structures, a comparison of which was shewn in the table exhibited, the quotation for iron was for colonial manufacture. It might be the view of some people that it was a wise thing to pay something extra in order to encourage manufacture in the Colony, but the extra amount so given was given for that purpose only, and it should not be added to the actual cost of the bridge. Moreover, there was no doubt that Mr. Allan had proved his case, without thus surcharging the ironwork with regard to the preference of the timber over the iron bridge, but if we came to smaller bridges the difference between the permanent design and the temporary one was not so great. In preparing railway estimates he had made the following calculations, which illustrated these views:—

Comparison of timber as against permanent bridge work—assuming no repairs to latter, and in the former about one-fifth,

that is the more exposed parts, required renewal in 11 years, and that the whole had to be rebuilt in 22 years—£100 is provided.

The permanent work is assumed to cost ... .. £100

The timber work one-half, viz. ... .. 50

Balance remaining, should the timber bridge be built ... .. £50

Of this balance £7 is placed at compound interest at 4% producing in 11 years £11, with which about one-fifth of the bridge is renewed—£43 remains which, at same interest in 22 years, becomes £102. The whole bridge is now rebuilt for £50, leaving balance of £52 by which the renewal fund is more than kept up. The depreciation is therefore about  $\frac{1}{3}$ % per annum on the actual capital expended.

If, therefore, the permanent work costs not more than twice the timber work, it should be preferred from a financial point of view, independently of the objection, in railway work, to renewal as interfering with traffic. This is about the proportion of cost of small openings at 3ft. to 4ft. between concrete or brickwork and timber.

Mr. SMAIL said—one thing he noticed in the new design, was that any member of the truss could be renewed without staging below, while with the old style of bridge when this was being done a temporary one had frequently to be built. The speaker mentioned that in 1876 he erected a bridge of the 1866 design, in which the very best timber procurable was used. It occurred to him then that from the way the bridge was designed, if any part had to be renewed, practically a new bridge had to be built. He thought it would be far better to build small bridges, culverts, &c., with stone or concrete.

Mr. BARRACLOUGH said there was one point he would like to refer to, and it was the method shown in one of the diagrams of treating the top member as a long column, and he would like to know if Mr. Allan had compared the method which he had employed with the theory of long columns, as the variable load

on the column in question would make the matter a very complex affair.

Mr. STATHAM remarked that there were a great many points in favour of Mr. Allan's design in comparison with the old ones. It was a great defect that so many timbers were in contact in the chord, the damp got into the joints and caused great damage, which practically meant the renewal of the chord, and when the chord was done the bridge was practically done, but in this new design there were a great many improvements. The new method of making up the top chord of smaller scantlings utilised the best part of the timber. Such bridges as these should last 30 years which was the life of the best ones.

Mr. SIMPSON—One thing that struck him was the comparison of prices. It was not a fair thing to compare colonial iron work with timber work, because the former is not of the cheapest kind. He assumed that the price of timber work included the painting, at 4s. per cubic foot, and that of the iron was at 23s. per ton, erected. Then taking Mr. Allan's margin of safety, he found that for the 90ft. span the price of steel work was 7s. per foot of the top chord, as against 3s. for timber, so that these comparative prices were in favour of timber. Personally, he would prefer to deal with a steel or iron structure. As regards the extra prices and renewals, a certain proportion of this timber work had to be renewed in a few years, and it seemed the renewal prices had been calculated upon the same basis as for the original, which was quite incorrect. A timber bridge requires constant inspection, which would add greatly to the cost, and for these reasons he thought he would prefer larger works to be of steel instead of timber.

Mr. BURGE, in explanation, said that the Chairman had remarked upon the cost of renewals being taken as the same as the original provision of the timber, but Mr. Allan had provided for the extra cost. He had put down the cost of the renewal of planking at £220 as against £180 original cost, and of the rest £950 as against £630. As to his own (Mr. Burge's) comparison,

he had made no extra allowance in the railway bridge, and for a very good reason. The material for the original bridge had frequently to bear long road cartage, but the train brought the renewal mentioned to the spot at a very low rate.

Mr. ALLAN, in replying, said that the exhibiting by Mr. Deane of the plans of the truss bridges to be erected on the Narrabri-Moree railway line, clearly showed how economically Australian hardwoods could be utilised for railway structures. Mr. Burge, whilst agreeing that in any case a saving in favour of the timber bridge at Wagga Wagga had been shown, thought the timber structure should have been compared with an imported metal bridge. He could not follow Mr. Burge in this, the iron-work in the timber bridge costing £490 was not only manufactured but rolled in the Colony, the iron bridge was also stipulated to be manufactured in the Colony, therefore the estimated actual cost to the country, irrespective of colonial rate of wage, duty, or other similar contributing causes was, Mr. Allan held, the only basis on which a comparison could be made. He could not with confidence make any remarks on Mr. Burge's comparison, as to the relative financial results of small concrete and timber railway culverts, without looking into the question. The experiences of Mr. Smail as to the difficulty of renewing timber in the old type of trusses agreed with his conclusions. The complex character of the theoretical investigation of the strength of a column, carrying different loads throughout its length, remarked upon by Mr. Barracrough, was the reason of reference being made to the case in the hope that information might be given by some of the members on the question. The Author's practical method of treating the subject was based on actual experiment as to the buckling strength of ironbark columns of different ratios of length to diameter.

Mr. Statham's opinion that the using of fitch pieces permitted of matured timber being utilised, thereby ensuring cheap supply and increased durability, is of considerable importance, the benefit of which has been recognised in the new type of trusses.

The Chairman was in accord with popular opinion, that in the long run a steel bridge was cheaper than a timber structure, but the Author pointed out that this popular opinion only held good when pine or other soft wood with a short life was used, in lieu of the much more durable Australian hardwood, and that the Chairman did not support his opinion with the necessary tabulated statement, similar to that submitted by the Author, shewing the comparative cost of interest, renewals, and maintenance of a steel and timber structure. As previously reasoned, Mr. Allan considered it would have been incorrect to compare the Wagga Wagga timber bridge with an iron bridge based on imported prices, but even supposing it possible that by importing the iron bridge the cost could have been reduced by £1,000, there would still be a saving of £10 per annum in annual charge, equal to a capital value at 4% of £250 per span in favour of the timber structure. As the decks in each bridge were similar, the inconvenience to traffic during renewals would be common to both designs, whilst the timber truss members could at the end of twenty-five years (if then decayed) be renewed without interrupting traffic.

#### FASCINE WORK AS CARRIED OUT BY THE PUBLIC WORKS DEPARTMENT IN NEW SOUTH WALES.

By T. E. BURROWS, L.S.

(Communicated by J. W. Grimshaw, M. Inst. C.E.)

[With Plates 9, 10.]

[Read before the Engineering Section of the Royal Society of N. S. Wales, October 15, 1895.]

THE history of embankments for river training purposes in New South Wales, in which the use of fascines of 'Ti-tree, or similar scrub form part, commenced as far as the author is aware only

ten years back; but the principle of using fascines of a bushy nature, to bind clay or soil together, has been availed of in many and various instances, either for rough mining dams, or to form mattresses upon which roads or light tram lines might be carried across swampy ground.

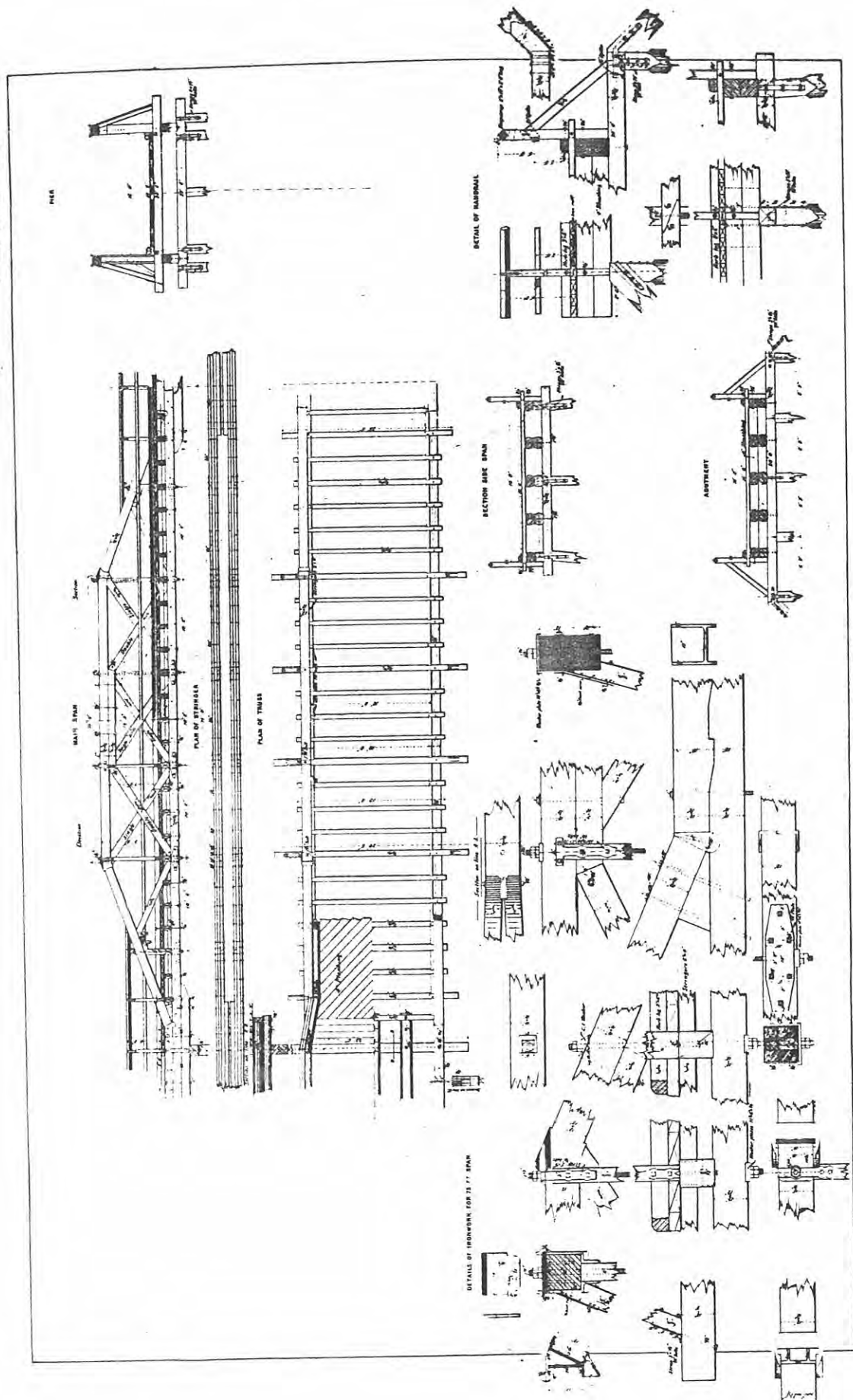
Indeed the first fascine work with which the author was connected, was the construction of a temporary dam of fascines and untamped clay, at a breakaway in the town dam (on western end) at Parramatta about 1880; and owing to the force of the water, the river being in flood at the time, it can safely be asserted that only through the use of fascines, for binding the clay, and easing off the power of the stream, the work of repair to the main dam would have been much more expensive than was actually the case.

Fascine work was introduced when Mr. E. O. Moriarty was head of the Harbours and Rivers Department, but the greater portion was carried out under the Engineer-in-Chief, Mr. C. W. Darley.

The credit of the introduction of this class of work into New South Wales is due to Mr. Alfred Williams, M. Inst. C.E., under whom the author had considerable experience, and as Mr. Williams had the advantage of employing this description of river bank protection in England, at the river Severn; where the range of tide is considerably more than our six feet, he saw to what advantage such work could be put, in the proper alignment of our rivers with their unsightly, useless, and muddy Mangrove flats; where the use of stone embankments would prove too costly to allow of the work being undertaken; especially in such places where soft bottoms are met with, as the entrance to the Long Cove Canal at Leichhardt.

Two notable descriptions of fascine work, have been constructed under the supervision of officers in the Public Works Department, and these the author will designate as "Fascine Embankments" and "Fascine Wall."

# PLATE I.



(96272-95-6)

[ENGINEERING SECTION.]

PLATE 2.

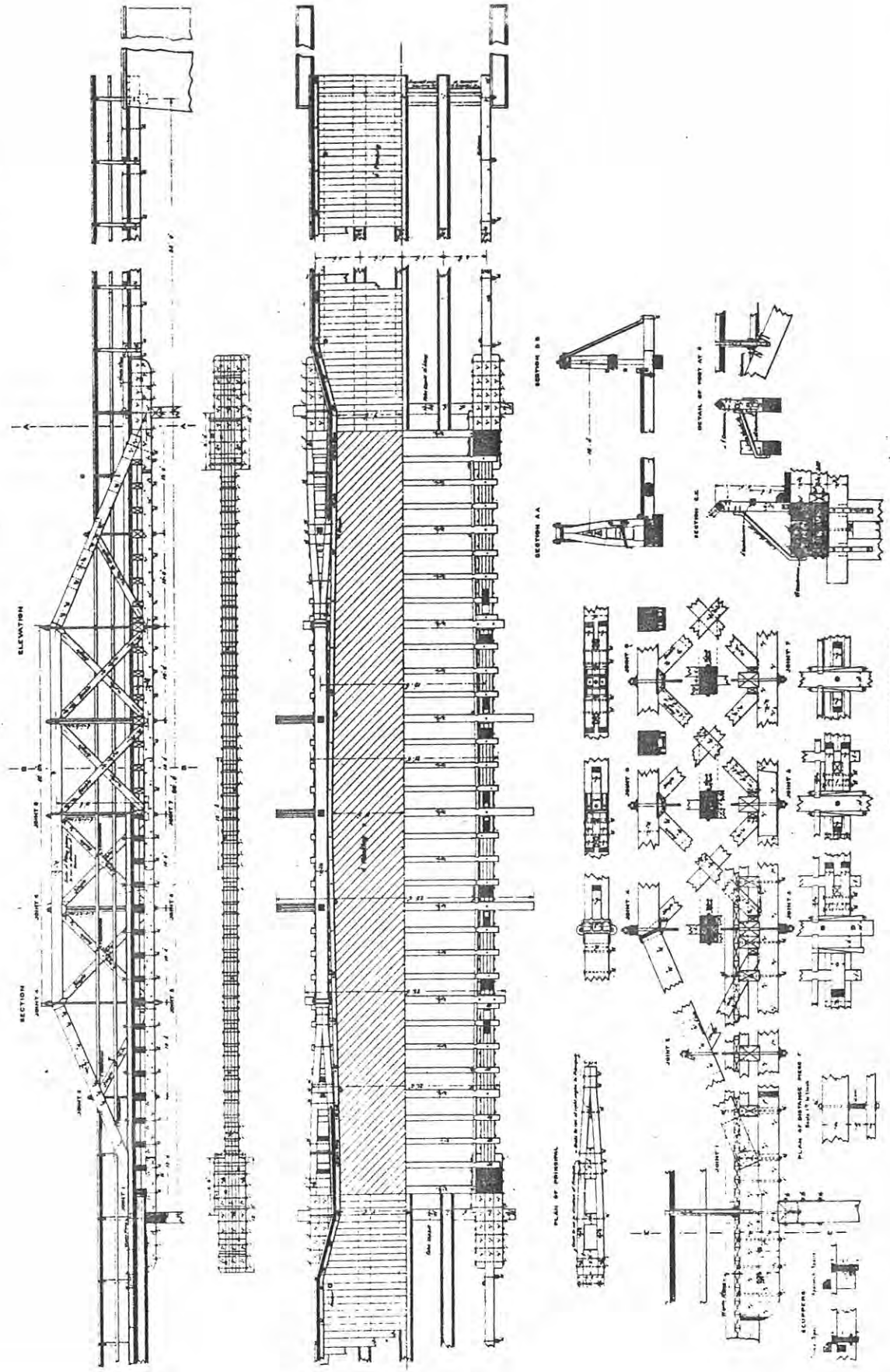




PLATE 4

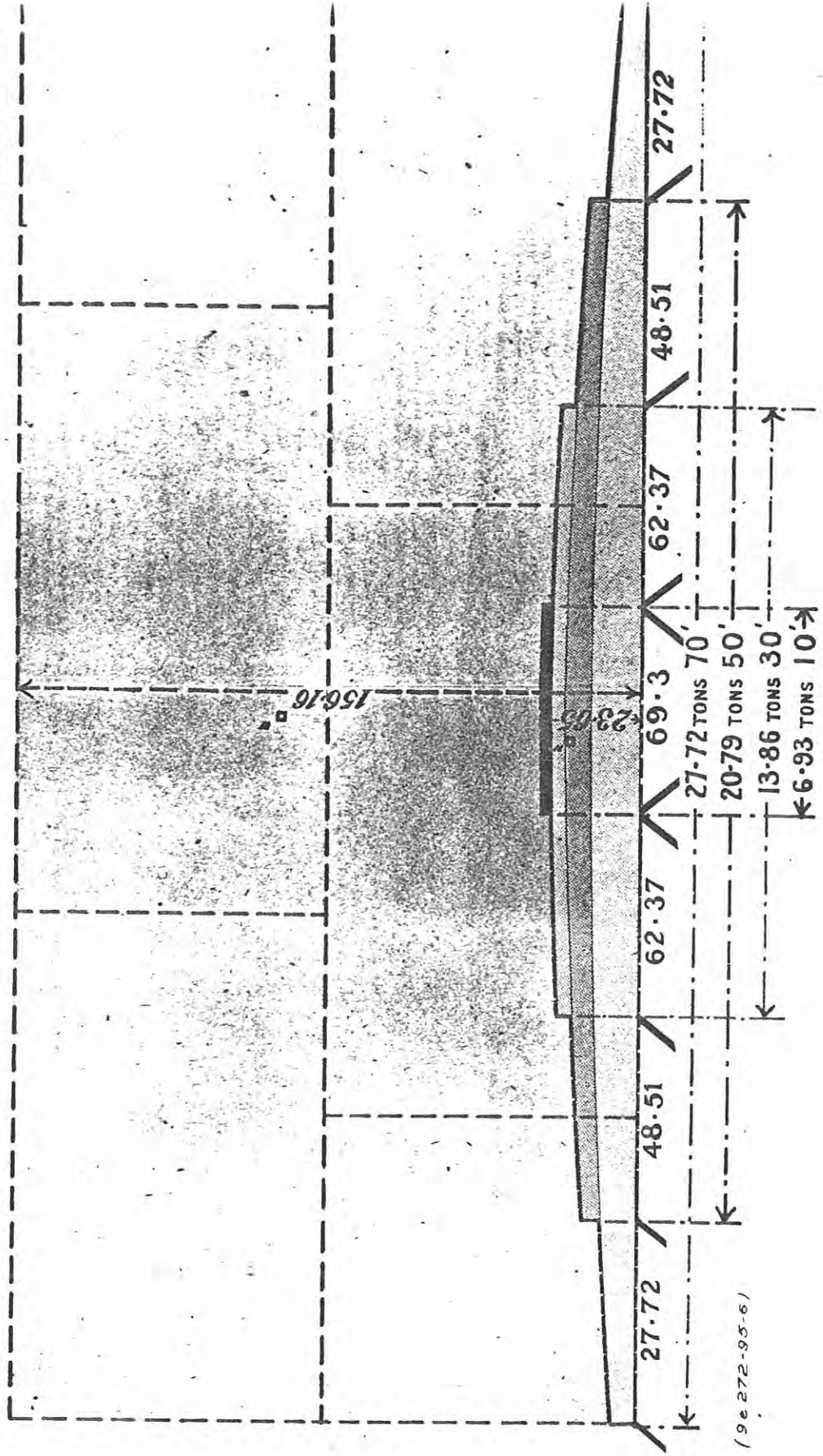


PLATE 5.



FIG. 1.

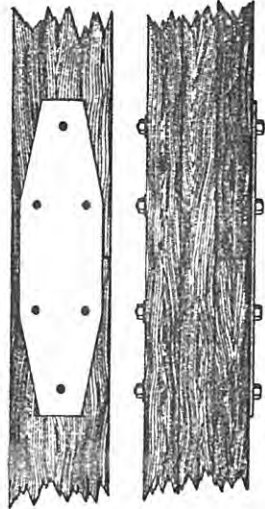
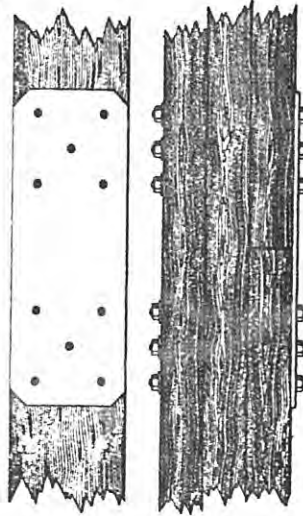


FIG. 3.

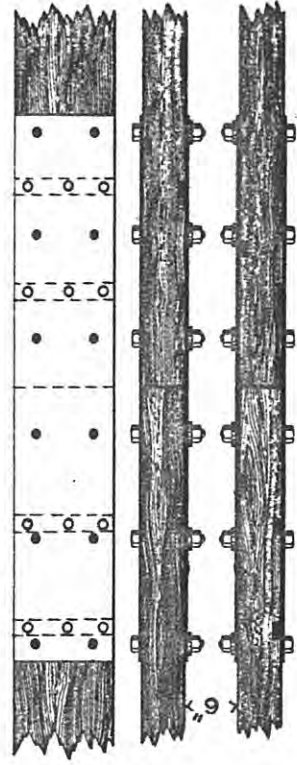


FIG. 2.

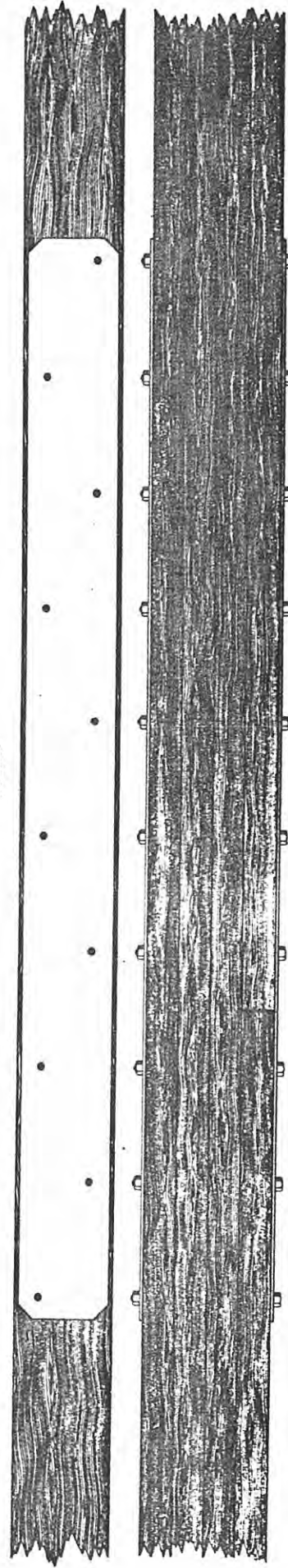
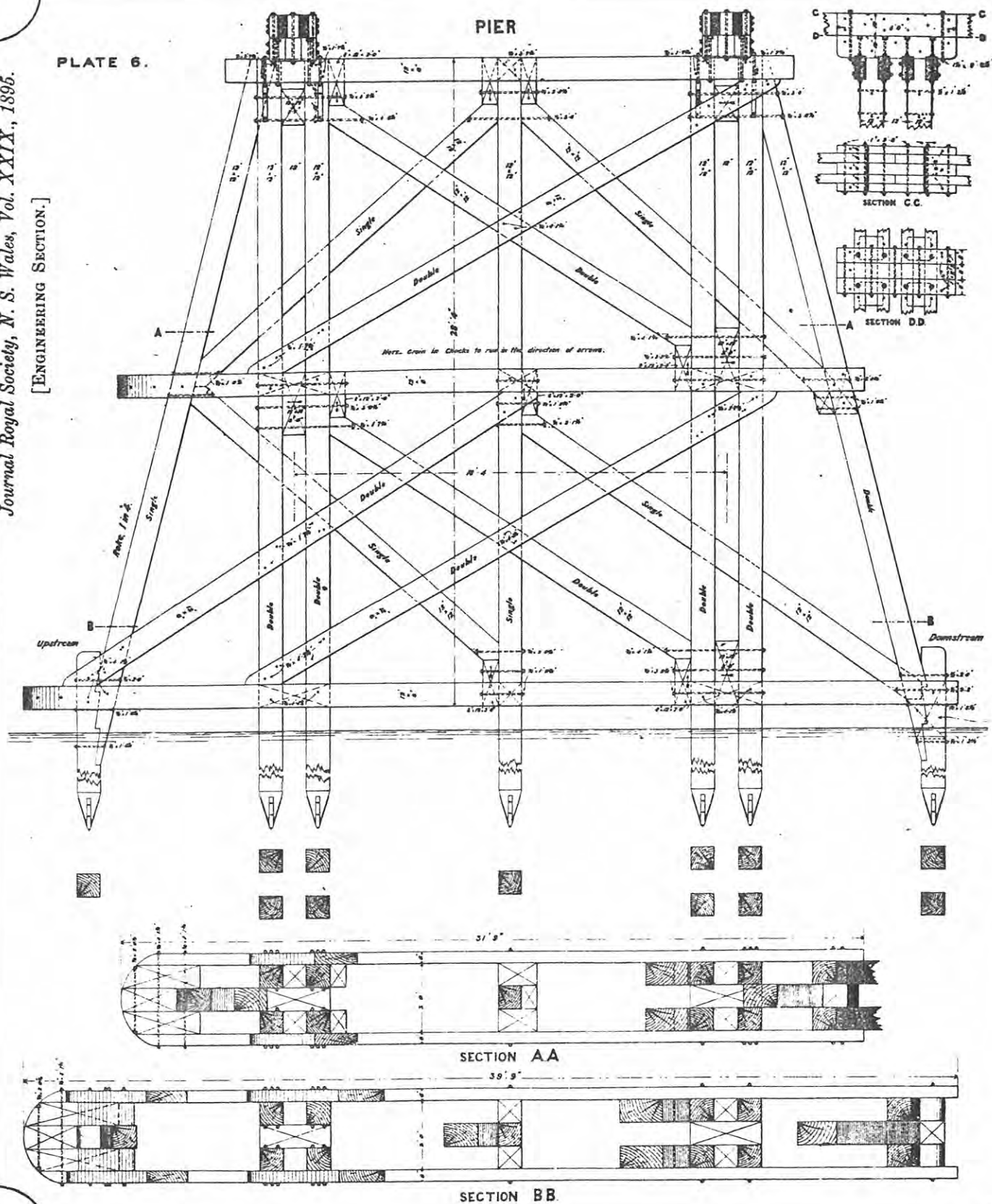


PHOTO-LITHOGRAPHED AT THE SCOT. PRINTING OFFICE,  
FROM A NEW SOUTH WALES.

PLATE 6.



9e 272-95-6

PHOTOGRAPHED AT THE GOVT. PRINTING OFFICE  
STRAIT 1895 804 11 INCHES

PLATE 7.

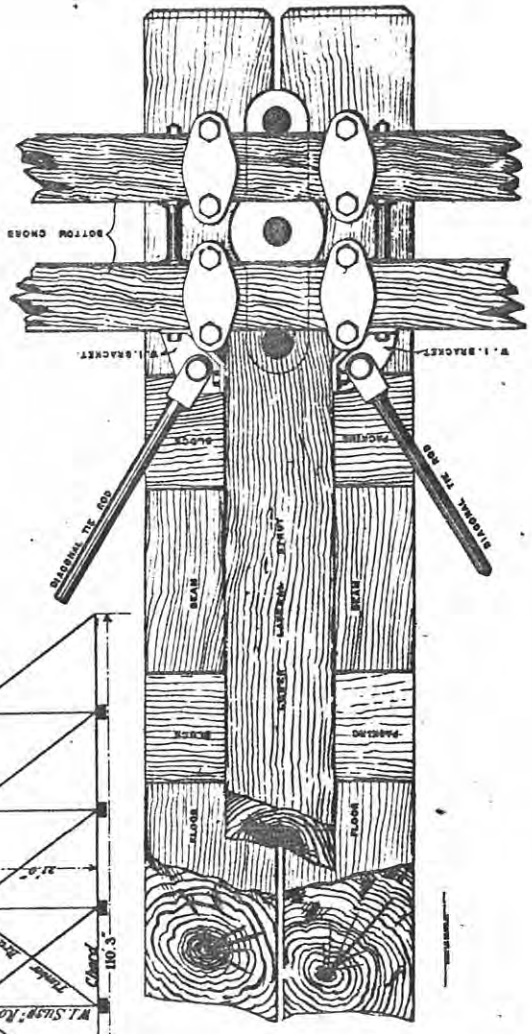
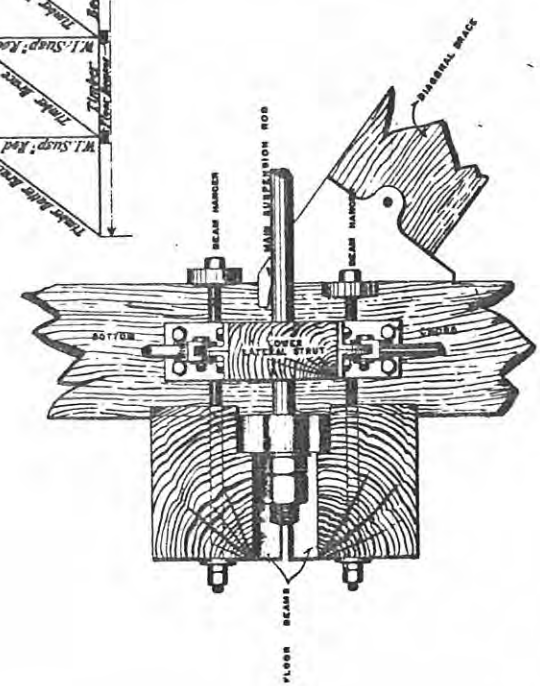
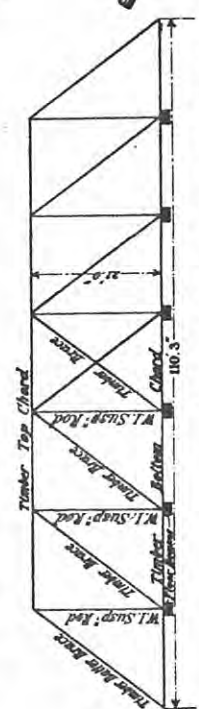
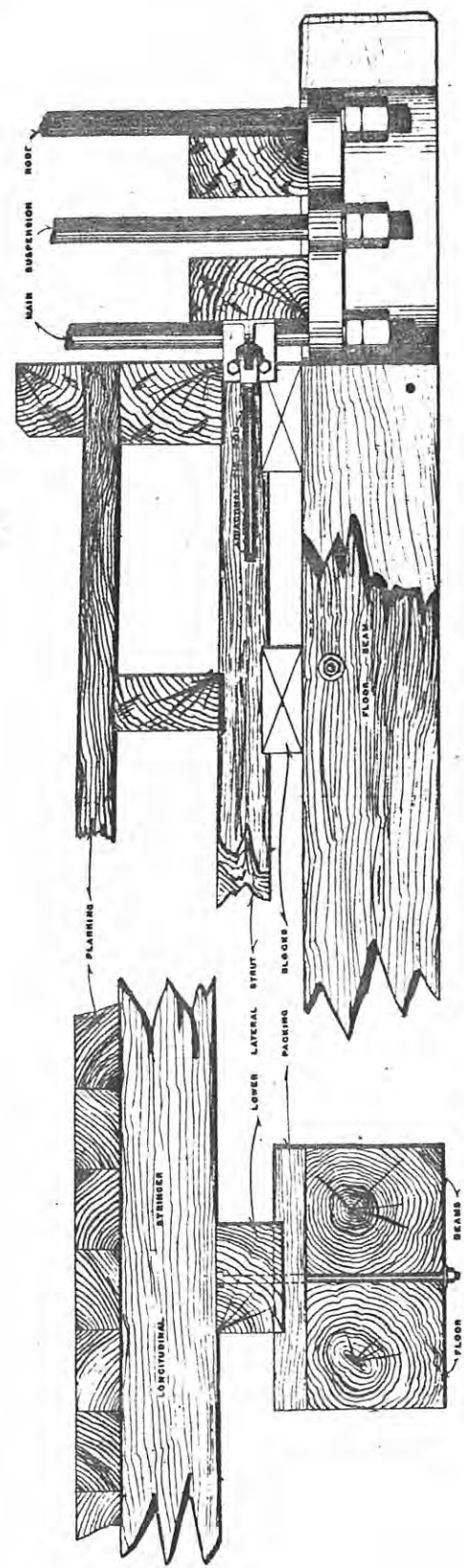
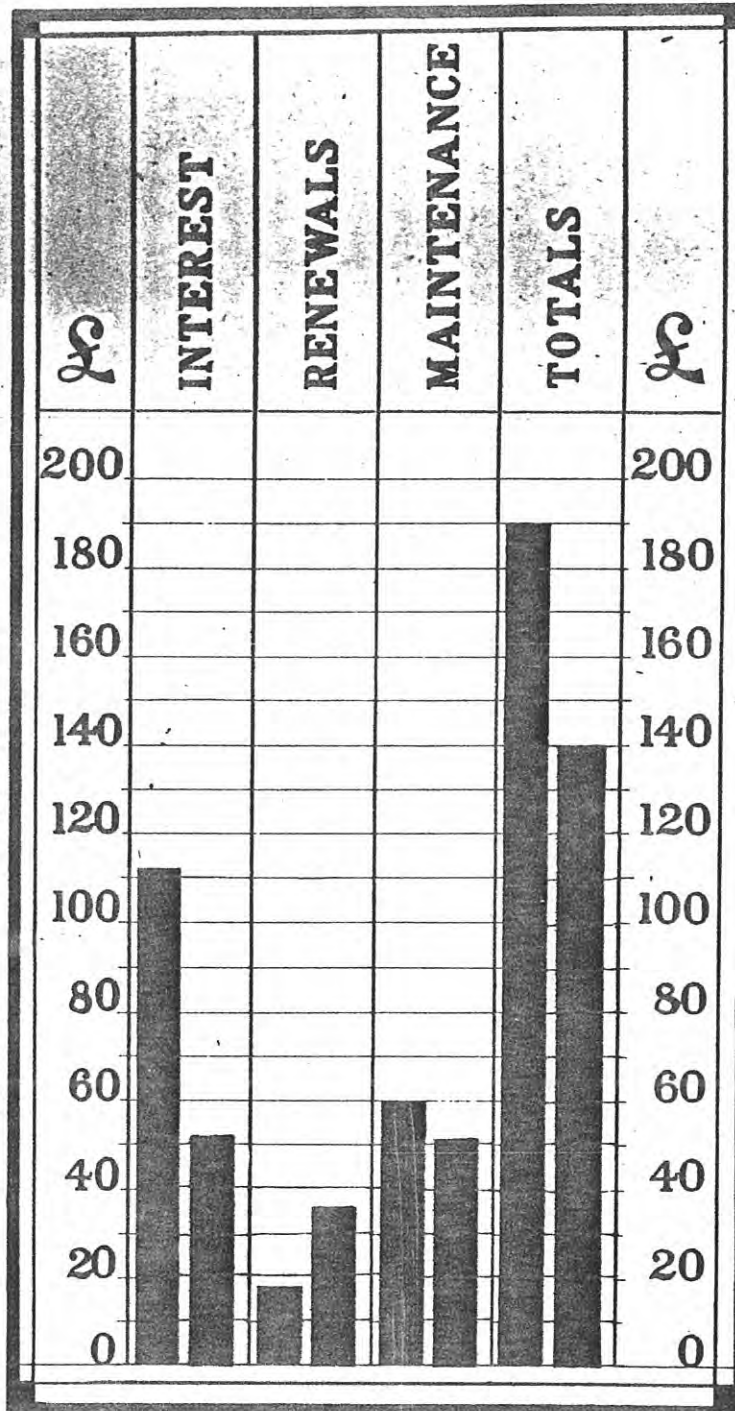


DIAGRAM  
OF  
ANNUAL CHARGES

IRON BRIDGE  
SHOWN THUS

TIMBER BRIDGE  
SHOWN THUS

PLATE 8.



9c 272-95-6

**PRESS CLIPPINGS**

# OPENING OF THE NEW WAGGA TRAFFIC BRIDGE.

## CHRISTENED "THE HAMPDEN."

### ① AN IMPROVED STRUCTURE.

For many years the old Wagga bridge, constructed of timber, offered the only satisfactory and expeditious means of crossing the river Murrumbidgee. Punters were in use at a few places, yet the labour of crossing by these means was considerable under the most favourable conditions, and during times of flood traffic had to be suspended. The private company which built the old bridge, which is of wood, was formed in 1860, and on 27th October, 1862, this structure was opened for traffic. It has stood in constant use since that date, a period of 33 years, and has now been replaced by one of modern construction, with advanced engineering improvements, the decking being several feet above the highest recorded flood in the Murrumbidgee. The new bridge is of imposing appearance, and has the advantage of a roadway of a width which will allow of exceedingly heavy traffic from both sides passing at any point, and consequently a greater immunity from accident through collision of vehicles. At times the crossing of bullock teams drawing heavy waggons has been a source of great danger to those travelling in light vehicles, and many accidents have accordingly resulted. The roadway of the new bridge is the widest of the kind in New South Wales, and this feature will be fully appreciated by those who are compelled to use it as a means of crossing. In addition there is also a safe path for foot passengers fully protected by railings. It is described in the official records as a very fine structure, creditable alike to the Department of Public Works, as to the contractor who carried out the work. It is the largest timber structure, carried by iron cylindrical piers, yet erected in New South Wales, and, as far as can be ascertained, in the colonies. The bridge differs from the usual American type of Howe truss in the omission of all counter-braces where the analysis shows them not to be required. In America these members are introduced to give lateral stiffness to the main pine braces. In the Wagga Bridge the great strength of the ironbark used renders this unnecessary. The great height above the summer level of the river, and the nature of the piers, will render unnecessary the work of watching the structure during periods of flood, and removing by means of heavy iron hooks attached to ropes any timbers, which in former times used to collect against the sharp piers of the old bridge.

The opening of such a structure free to the public must, therefore, become an event in the annals of any district, and yesterday must rank as one of the "red letter" days of Wagga. By reason of Wednesday (tomorrow) having been proclaimed a public holiday in the Wagga district, and the opening of the bridge having subsequent to the notification been fixed for November 11th, the latter event was robbed of some of the display usually noticeable on such occasions. Those comprising the Fire Brigade, Friendly Societies, and kindred bodies in the town of Wagga were not represented by reason of the business places in the town not being closed.

④ number of those present better than that of the Mayoress, perhaps he had better tell them that it would be named after their coming Governor, Lord Hampden, and would be called the Hampden Bridge. He hoped that the residents of Wagga would not only associate that name with the name of their Governor, whom he hoped would be a worthy Governor, but it was also the name of an old British race of Hampdens, who had fought for the liberties of the people in England several centuries ago. (Applause.)

Mrs. Heydon then came forward and christened the structure the Hampden Bridge, breaking a bottle of champagne over the rail amidst cheering.

Subsequent to this portion of the ceremony the Hon. J. H. Young continued his remarks. In declaring the bridge open for general traffic he wished to thank them sincerely for having asked him to come up and take part in their rejoicing. He had no doubt Wagga thought the day one of great rejoicing. (Hear, hear.) He was fortunate enough to be able to read that morning an account of the opening of the bridge that was standing alongside the present structure which occurred some 33 years ago. He noticed the chief speakers on that occasion on that occasion said it was a "red letter day" for the people of Wagga. If it was a red letter day in its time he thought the present should also be a red letter day, and he hoped it would long live in the memory of the people of Wagga as such in their history. (Hear, hear.) Something had been said about the structure, and he would give them a short history of the previous bridge, and also something like a comparison of the old bridge with the new one. Knowing that figures were generally troublesome to listen to, and statistics were generally non-interesting, he did not care to go to any length into the details. Suffice it to say that the erection of the new one showed the growing wants of the people of Wagga. It also showed the great advance in the science of bridge building. He had no hesitation in saying, on the reports of his officers—he did not profess to be an engineer himself—he had every reason to believe the bridge was a credit to the man of the department who designed it, to the contractor who had carried it out (hear, hear), the credit of the supervising engineer whose duty it was to keep the contractor up to the mark, and he hoped it would remain to the credit and joy of the people of Wagga for a great many years to come. When they considered that the bridge which it replaced was built something like 33 years ago and had nothing but timber foundations, not a stable structure they now had, they would fairly believe the new bridge would last fifty years, and if so he had no doubt it would be well-spent money in the interests of the people of New South Wales. Bridge building formed a very large part of the public expenditure and there were that day something like seventy bridges in process of building. The department was preparing plans for something like 70, some of which were more expensive and some considerably less. There was, also, a large fund at his disposal—he did not mean to say he was going to play ducks and drakes with it—and they might depend on it he would make it his business to see it fairly distributed. There was another branch in which thirty or forty more bridges would be built for New South Wales during the next 5 or 6 months.

⑦ bridge was 24ft. 4in. as against 17ft. 6in. on the old, and there was a footway of 4ft. 6in. The height above the summer level of the river was 42ft. 3in., and the highest known flood reached 85ft. 9in. He thought they might rest in calmness, no matter how the floods came down, it would not be necessary to watch night and day and remove timber which stopped on the piers, as it was with the other. From the height of the decking above the river, there was no chance of its being removed. In the piers of the bridge were 132 tons of ironwork, and on the upper structure were 72 tons. A great deal of strong timber had been used. He was pleased to learn that the timber was not from the neighbourhood of the Murrumbidgee. They might think it peculiar he should say so, but he represented the district from whence it came. Some of the money had been spent in Wagga, some in the old country, and some in his district, which produced the splendid ironbark and tallow wood. There were 17,000 cubic feet of ironbark, 7500 of tallow wood and 720 cubic yards of concrete in the bridge. He would again thank them for inviting him to Wagga, the Mayor and Alderman, and Mr. Gormly, who pressed him to come. However much he might think of the Mayor of an important city like Wagga, it was his place also to think of its representative in Parliament, and his esteem for Mr. Gormly was great. He had known him ever since the latter had been in Parliament. Although Mr. Gormly was a much older man he was not so old a politician. He knew Mr. Gormly had looked after the business of the electorate as well as it was possible for any one to do, he had taken a worthy part in Parliament, and had never lent himself to factious opposition or wasted the time of the House, and he (Mr. Young) had every reason to respect him. He was glad to come with him to his constituency, and hoped they would give him every credit for his work. He was also pleased to see Mr. Fitzpatrick there, who was comparatively a new chum, but he felt sure by the way he had commenced, if they lived so long as Mr. Gormly, he would be able to speak in just the same terms in respect of him. He did not think it was fitting that he should make a political speech, as if he spoke of the Ministry it might please some, and displease others. If at any time the opportunity came of speaking to the Wagga people politically they might depend upon it he would be glad to do so. But that time was not now. He was only there to join with them in their rejoicings, and to do the best he could to help the day to pass off with as much eclat as possible. (Hear, hear.) He had much pleasure in declaring that the Hampden Bridge open for the public traffic of New South Wales. (Applause.)

Three cheers were then given for Her Majesty the Queen. Cheers were also given for the Mayoress, Mayor, and Minister.

At the conclusion of the proceedings the Minister with Mrs. Heydon, and the Mayor with Mrs. Williamson accompanied by a number of residents crossed over the bridge to North Wagga. Here they were welcomed to North Wagga by Ald. Hayes and Williamson. A return was then made and the assemblage dispersed.

⑧ The bridge was gaily decorated with flags and bunting of every description which gave quite a festive appearance to the scene. At the opening ceremony there could not have been less than two thousand present, residents coming in from all directions to witness the occurrence.

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The Town Band and Wagga Infantry, besides hundreds of school children, and numerous pedestrians, however, made up a large gathering, which was representative of the town and district. Had the date of opening been either earlier or later, the procession would have been much more imposing, by reason of the certainty of the day being proclaimed a public holiday. However, the proceedings passed off without hitch or accident, and the opening of the bridge may be said to have passed off with the general rejoicing upon such an occasion.

# ARRIVAL OF THE MINISTER.

## THE OPENING CEREMONY.

The Minister for Works, the Hon. James Henry Young, arrived at Wagga by the mail train yesterday morning, being accompanied by Mr. James Gornly, member for Wagga Electorate, and Mr. Thomas Fitzpatrick, member for the Murrumbidgee. At the railway station the Minister was met by the Mayor and aldermen and some of the townspeople and escorted to his hotel. He was taken to the Town Hall, whence a procession started at about a quarter to twelve. The G Company of Infantry, in charge of Lieut. Jefferson, assisted by Lieut. Shaw and Staff-Color Sergt. Shipley, led the way to the strains of the Town Band. The bridge was crowded with schoolchildren, and a passage along the centre of the structure was kept clear and traffic regulated by the police. At the centre of the bridge was a dais, erected by the contractor, which was occupied by the Minister, members of Parliament, and some ladies, including Mesdames R. S. Heydon (the Mayoress), Bruce Suttor, W. F. Burrow, J. S. Taylor, Thane, Fuller, Orr, Williamson, R. Thompson, C. Hardy, Harsen and Misses Orr and Suttor. The Minister, preceded by a band of honor, then ascended the Ministerial party passed to the platform.

At noon, everything being in readiness, Mr. R. S. Heydon, Mayor of Wagga, in opening the proceedings, said before the formal opening of the grand new bridge upon which they had assembled he thought it would not be out of place to say a few words concerning the old bridge as a sort of farewell to that structure alongside them. He happened to be there at the opening of the Company's bridge, and he thought if there was one thing more than another which had a tendency to put Wagga ahead, that one thing was the Company's bridge. (Hear, hear.) The inconvenience of crossing the river was immense. Sometimes those desirous of getting across had to wait for days. He recollected on one occasion a person crossed the river by attaching barrels to the wheels of his waggon, but a second one who tried to do this was unsuccessful and lost his waggon and was nearly drowned. Then the new bridge was built entirely by private enterprise, and it was a very grand thing in Wagga to have that means of crossing. Private enterprise had had a lot to do with the progress of Wagga. At the present time they had a bridge built by the Government which he had no hesitation in saying was second to none in the colony. (Hear, hear.) It was a splendid bridge, equal to all their requirements, and it was several feet wider than the majority of bridges. It was able to carry two vehicles abreast with safety, and he believed they had to thank their member, Mr. Gornly, in a great respect, for the manner in which he had attended to the requirements of the people.

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Every district throughout the country, in which punts were running from side to side of the river, was anxiously looking forward to the time when they would be superseded by a structure something like the Wagga bridge, larger or smaller as the case might be. He was perfectly satisfied that it was an advantageous way of spending the money. He did not wish to depreciate bridge enterprise; he had no doubt that the old bridge was of great advantage to the people of Wagga and the district, when private enterprise stepped in and built the bridge which had served their purpose for so long a period. They had made a large amount of money by their enterprise, and he did not begrudge it to them. He thought any who spent their money, and joined together to carry out the enterprise deserved a fair remuneration for that enterprise. Looking at the bridge he did think they were wise in their generation, in selling it exactly at the time they did. (Hear, hear.) They had managed to carry out the bargain, and he did not want to look too closely into ancient history, but he did not think that while he was Minister any body of private individuals would ever be able to make so good a bargain with him. (Laughter and hear, hear.) He would say a few words by way of giving them some salient points of comparison between the new bridge and the other. He thought it would be interesting to hear something like a comparison between the two bridges as to their designs, capabilities, cost and many points of construction. The first bridge was commenced in 1861 and completed in 1862; it cost £8004, including the approaches, to which the Government contributed £1500. It had a carriage way of 17ft. 6in. and two footways of 3ft. each. A fair estimate of the amount of cost of the new bridge would closely approximate £13,000. It would have a carriage way of 24ft. 4in., which was largely due to Mr. Gornly, and he was willing to give him all the credit he deserved and trusted the people would never forget his efforts. It connected with roads leading to such an important town as Wagga, and it would give sufficient room for two vehicles to pass. He had heard of one town in the country nothing like the size of Wagga, with a stream nothing like the Murrumbidgee, where because the bridge had only 12ft in width, where two vehicles could not pass, a second bridge was built, almost at once. There would be no necessity to build another bridge for that reason at Wagga. The first bridge was freed in 1884, and he thought it was understood that the purchase money was very remunerative. In 1884 it was handed over to the Government. It cost only £8000, and the Government contributed £1500, so that the outside cost to the company was £7100. It was 22 years old, and it was handed over to the Government for £2804—("Good business")—and it was a very nice thing for the people who built the bridge. (Hear, hear.) It was also a very nice thing for the people of Wagga, although it cost the country a lot of money, and it was then opened for the traffic of Wagga. If it lived in the memory of the people of Wagga it would be considered a "red letter day" when they could come across without having to be stuck up by the toll collector for 3d or 1s, as the case might be. It cost a large sum of money to keep it in order. In 1893 it was reported as being beyond repair; the repair necessary to make it serviceable would have been an useless expenditure and it was thought better to build a new bridge.

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# THE LUNCHEON.

The Minister was entertained at a luncheon held in the large dining room of the Criterion Hotel, the function commencing at half past one. The chair was occupied by his Worship the Mayor (Ald. R. S. Heydon) who had on his right hand the Minister for Works, and on his left the Right Reverend W. Chalmers, Bishop of Goulburn. At the same table were seated the Rev. G. A. Carver, Messrs. James Gornly M.L.A., Thomas Fitzpatrick M.L.A. and George Coleman. Mr. Henry Baylis P.M. was in the Vice chair. There was a large attendance of representative townsmen.

The Mayor, in accordance with the time honoured custom, first proposed the toast of "The Queen" which was loyally received, after which the health of the "Prince of Wales and all the Royal Family" was duly honoured.

The Mayor proposed the toast of "The Ministry of New South Wales" and said that in submitting the toast he must crave the indulgence of those present because he felt that it was the chief toast on such an occasion and feared that he was unable to do it justice. It was the happiness of the people of this country, owing to the freedom and privilege they enjoyed under the British Constitution, that they were enabled not only to form an opinion on political questions, but to express their opinions if need be. On that occasion they had present adherents of various shades of politics, but notwithstanding all this they agreed to differ in an intelligent, friendly, and honorable way, and he felt sure they could all unite on that day in doing honour to the Ministry which had proved by the measures it had passed and the measures that were now before Parliament, as well as by the strenuous efforts it was taking to improve the condition of the people, that it was not only an intensely zealous and hardworking Ministry, but that the members of it acting loyally under the guidance of its Premier, the Honorable George Reid, were influenced by the purest and noblest motives that could inspire any administration, the advancement of the physical, moral, and spiritual condition of the people. In submitting that toast he would more particularly refer to the representative of the Ministry, the Honorable J. H. Young, who had honored them that day by opening their new bridge. It was needless perhaps to mention or refer on that occasion to the distinguished services that the Honorable gentleman had rendered to his country. It would be quite sufficient for him to say that their guest now held one of the very highest positions in the State, and had held as speaker of the Legislative Assembly the highest position which could be given to any man by the direct popular vote of his country. They all knew that sometimes the noblest deeds met with no other reward than the applause of an approving conscience, but on that occasion they were sensible of the fact that the merits of a worthy and courageous fellow countryman had been, to some extent at least, publicly recognised. He asked them to drink heartily to "The Ministry and its representative, the Honorable J. H. Young."

The toast having been drunk with enthusiasm.

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Mr. Gormly, who was well received, said Mr. Heydon had referred to the great difficulty in crossing the Murrumbidgee in days long past, still probably he knew the danger of not having suitable approaches over the river bridge, probably, as well anybody present that day. (Hear, hear.) He remembered fifty years ago there was only one crossing from the source of the river to its junction with the Murray. That was by a punt at Gundagai, and he well remembered the establishment of the old punt at Wagga, and the first punt at Narandera, and the first punt on the Murrumbidgee at Bay. (He was very pleased that such a very suitable bridge had been constructed at Wagga. They knew that although the old bridge at Wagga had done very good work, the northern approach was very difficult to cross, when the river rose in ordinary flood. He recollected on a dark night he had to swim his horse over the northern approach. When the officer of the Works Department proposed to make plans for the erection of the new bridge he impressed on him the necessity of making the northern approach of sufficient length so that people could cross that river in any ordinary freshet, and of having the structure sufficiently wide to admit of two loaded teams passing over at the same time. He was pleased to see the approach had been erected in such a suitable and substantial manner. He was glad to see such a great interest taken in the opening of the bridge to cause so many people to be present that day. The Minister for Works, Mr. Young, would address them at some length, and the speaker would not be justified in detaining them any longer. He was pleased to see the extensive approaches on the northern side, and although the old bridge had done good service, he was sure the present one would meet the requirements of the growing district in a more suitable manner than the former structure. (Applause.)

The Hon. J. H. Young, next addressed the assemblage, and said he had been asked by his Worship the Mayor to declare the bridge open for traffic, but before doing so he would call on the Mayor to perform the ceremony of christening the bridge. (Cheers.)

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Recognising that the bridge was not fit for the traffic of that important place the Government put up the present one. He took no credit to himself; he was in the position of reaping where he had not sown. The previous Ministers, on the application of Mr. Gormly and the Mayor, made up their mind to spend that money, and he was there to reap the plaudits of the people in opening it. At the same time they would readily understand while he was reaping where he had not sown, he was sowing now, the benefits of which other people would reap. He presumed the Ministers who preceded him would not object to his taking the plaudits on the present occasion. The new bridge was built on a new design, but he did not for a moment suppose that some old designs had not been worked into it. There was no other bridge as far as he knew in the world, much less Australia, of the same character. Mr. Hickson reported that it would give the maximum of strength with the minimum of cost. The commercial advantages were the facilities offered, as one portion might be removed for repairs without interfering with the ordinary traffic of the bridge. They would not avail themselves of that during the present generation. He would imagine that shewed the very great advances in the science of bridge building. (Hear, hear.) He understood the contractor was Mr. Stokes. The report was that he had carried out his work well. (Hear, hear.) He was very pleased to have that report. He did not know whether the contractor had made much money or not, he hoped he had; but if he had, and had carried out his work well, nobody should begrudge it to him. He was prepared to believe that private contractors would carry out works of that kind in a better and cheaper and more satisfactory way than the Government. He understood the bridge was longer in building than was intended, and that it was some six months over the time. That would be a case that would have to come before him as to whether the fines which had become payable after the expiration of the time should be enforced or not. ("No, no.") All he could say was that in his capacity as Minister for Works he had never been hard on the contractor who had honestly tried to do his duty, and he was not going to make a commitment to change that practice on the bridge across the Murrumbidgee. (Hear, hear.) The carriage way on the new

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The Hon. J. H. Young responded, thanking them sincerely for the very hearty manner in which they had responded to the toast of the Ministry. He said that the fact of the toast being received with such a degree of cordiality was a proof of the great hold which representative institutions had on the people of the British race. This was the case not only in the mother country, but in all parts of the British dominions, whenever there was a gathering of that kind composed of representative Britishers, and he thought he might say more particularly in the colonies of Australia, the toast of "the Ministry" was always received with great favour. He thought that this should be so, but whenever the feeling was made manifest it could not fail to give rise to gratification on the part of the representative of the Ministry. This feeling was usually quite apart from any consideration of the personnel of the Ministry, but was in reality the recognition by the people of the Ministry as chosen by the people's representatives to control the affairs of the country. It was fully recognised that every Ministry lived, so to speak, on the breath of the people's representatives in Parliament, and the moment the Ministry ceased to give satisfaction to those representatives that moment its political life must cease. Just in the same way when the representatives of the people ceased to give satisfaction to those who returned them to Parliament, the electors only awaited the opportunity of an election to throw them out and replace them by others more to their taste. This being so, it might generally be assumed that the Ministry holding office at the will of the people's representatives, held their positions also at the will of the people themselves. For this reason, if for no other, was it that representatives of the Ministry wherever they might go, were regarded as worthy of support, and were accorded the greatest honor by those whom they indirectly represent. Speaking of the Ministry of New South Wales which he had the honor to represent, he would venture to assert that the members of that Ministry had the good will of the people of the colony. He felt sure that no one, not even the greatest enemy of the Ministry, could say that they had not conscientiously endeavoured to discharge their duty in the best interests of the country. He felt that however much many people might differ from them on some points, it would nevertheless be generally conceded that they had very strong convictions and were doing the best

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The Hon. J. H. Young next addressed the assemblage and said he had been asked by his Worship the Mayor to declare the bridge open for traffic, but before doing so he would call on the Mayor to perform the ceremony of christening the

they could carry them into effect in the manner which they believed would result in the greatest benefit to the country at large. He did not say that the members of the Ministry were perfect by any means, but he sincerely believed that they were actuated by just as pure motives as any Ministry that had gone before it. In deciding on going to the country at the last general election the Ministry had not for a moment hesitated to put their positions in the scale in going before the people to see whether they deserved to hold those positions or not. If they had desired to hang on to office by sacrificing their convictions, they need not have appealed to the people at all, but could have retained office a long time. However the Ministry took the only course consistent with self-respect and the result fully justified their action because they were returned to office again with what he might fairly claim was an increase of strength. After the election one of their opponents remarked that he did not see how the Government had gone back to power stronger than before because the number of protectionists was just as large as before; but he (Mr. Young) replied "You may have the same numerical strength as before but all your brains are knocked out. In the absence of men like Dibbs, Copeland and Kidd, all the protectionists' brains are gone." He did not of course mean that to be taken quite literally or he supposed his friends Mr. Gormly and Mr. Fitzpatrick would take offence at it. He was quite sure that Mr. Gormly had as much brains and as good an order of brains as any protectionist in the country. Since the last election the Government had had an arduous fight. If they had not held the strongest belief in the principles they advocated: if they did not believe that the policy of freetrade and direct taxation would be advantageous to the country they would have given way long ago and allowed things to remain as they were. He could safely claim that the Ministry had been waiting for a change in circumstances. He would never believe that taxation could make anybody prosperous. He remembered hearing Mr. John See when bringing up his taxation proposals, assert that the taxation would bring the people into prosperity; but he could never believe that any tax would make people prosperous. He did not wish to go into party politics but he did trust that they would give the Government credit for having acted in the way they considered best in the interests of the country. He really felt that if they could bring about freetrade in New South Wales it would prove advantageous to the people of the country. Having said that, he would say no more about general politics. He would now make some reference to the personnel of the Ministry. As far as he himself was concerned he would say nothing, but would leave the people of the country to say whether he had acted rightly or not. He had not had the most pleasant time of it since he took office. Instead of being able to find Government billets for his friends and his friends' friends, he had had the unpleasant duty of removing from the public service people who were not required there. He had been compelled to act in many cases as if he had no bowels of compassion. He had had to resist the strongest appeals against removing those whose services were not required, and although he was not more efficient than most people he had found the task a painful one. The only satisfaction he had was that he had done his duty. As far as the other members of the Ministry were concerned, he was of the opinion Mr. G. H. Reid was ready to go on with the work. He

the necessity of making it so high as to be above the reach of floods, and also of making it wide enough to admit of any two vehicles passing on the bridge. He again thanked them for the way they had received the toast.

Mr. Fitzpatrick also responded, and in doing so said that they were all aware he was a new chum in politics, although during his short career he had had to fight two elections. He was proud to say that the people of The Murrumbidgee had chosen him on two occasions as their representative. He was glad to be present on that occasion to do honour to the Minister for Works. There was not a more honourable man in Parliament than Mr. Young. The only thing he regretted was that Mr. Young was not a good protectionist. He could claim to be an old Wagga identity, for although he could not go back 50 years like Mr. Gormly he could go back something like 40 years. He knew that if he attended on that occasion he would be welcome there, and that he would be among good friends. He thanked them very kindly for the way they had drunk the toast of "The Parliament."

Ald. Williamson proposed "The Contractor, Mr. S. F. Stokes." He said the bridge that had been opened that day was one of the finest in the colony. It was right that Wagga should be proud of it and right that the colony should be proud of it. It was right also that the contractor should be proud of it. He asked them to drink the health of the contractor, who though all sorts of drawbacks had worked on. The bridge had taken a very long time to build, owing to the frequent floods in the river, which had again and again washed the staging away. The contractor was deserving of every credit for the manner in which he had completed his contract.

The toast was heartily drunk.

In response Mr. Stokes said it was with feelings of gratitude he rose to respond to the toast of his health, which had been so graciously proposed by Mr. J. T. Williamson. Gratitude for the most kind expressions used in proposing that toast for their consideration, and for the very warm manner in which it had been received on their part. His satisfaction at having successfully accomplished what had been rendered by the most adverse circumstances a most onerous task, was not a little clouded with feelings of unquiet regret that the completion of that task will involve with it the fact that he would have to seek work elsewhere, and that he would have to leave the district where he had been so kindly received, and that he would have to part from so large a number of kind friends. In carrying out this work he had the most unusual difficulties to contend with, the most prominent of these presented themselves in a most remarkable succession of floods, which had not been experienced in the district for over twenty years; these floods not only caused tremendous currents in the enormously swollen river, but the heavy and continued rains softened the ground that it was impracticable to carry on. He was naturally much disheartened, but was determined nevertheless to persevere and carry out the work which he had undertaken, and so now felt proud of having accomplished it. He wished to express his thanks to those who while in his employ on the work had evinced so great an interest in carrying the work to completion, and by the help of their exertions they had now spanning the Murrumbidgee bridge seemed to none of its kind in the colony. He was glad to express his full

The structure is carried upon iron cylinder piers filled with concrete. The height of the roadway above summer level being 42 feet 8 inches. The highest recorded flood level was 35 feet 9 inches above summer level in 1853, vide the Wagga Express Riverine Directory. The new approaches have a grade of 1 in 30 from the main bridge to the Junee road, and during flood seasons traffic will have safe access to the bridge. This will be of great importance to the Wagga traffic, for the old approaches were impassable during flood, and accidents were of constant occurrence. The carriage way provided is of exceptional width, in fact, calculating the superficial area of the deck, the Wagga bridge is one of the largest traffic bridges in the colony. The roadway on the main spans is 23 feet between kerbs, and the timber approach spans 28 feet. A foot passenger way 4 feet 6 inches wide is provided on the upstream side.

The truss spans are braced overhead with timber struts and diagonal rods, the clear headway from the deck being 19 feet. To provide an easy grade for the earthwork approaches on the south side, a massive concrete retaining wall 400 feet long has been erected, and traffic will now pass over a roadway approach 40 feet wide. The footway on this approach is 18 feet wide, forming a continuation of the town footpath.

The total cost of the bridge was £13,000.

There are 132 tons of ironwork in the piers, and 73 tons in the superstructure. The ironwork was supplied by the Atlas Company, of Sydney. 17,000 cubic feet of carefully selected ironbark timber and 7,500 cubic feet of tallowood, brought from Wyong and the coast, have been used. The iron piers which are 7ft. 6in. in diameter at the base, and which have been sunk from 30 to 35 feet below the bed of the river, required 270 cubic yards of concrete. The total concrete used throughout the works was 720 cubic yards. The contract for the supply of ironwork and the erection of bridge was let to Mr. Stanley F. Stokes, of Newcastle. The work was erected under the supervision of Mr. W. F. Burrow, C. E., Resident Engineer for the Government, instructed by Mr. E. M. de Burgh, M.L.C.E., the Assistant Engineer for Bridges, Public Works Department.

## THE WAGGA BRIDGE COMPANY.

### EARLY REMINISCENCES.

In the year 1860, a company was formed for the purpose of erecting a bridge over the Murrumbidgee at Wagga. The capital of the company was £6000 in 300 shares of £20 each, but subsequently £10 was paid off on each of the shares. The original directors of the company were Messrs. F. A. Tompison, George Forsyth, Henry Wallace, Henry Baylis, and Dr. A. B. Morgan, Mr. Baylis acting as honorary secretary until the company was able to employ a paid secretary.

On the formation of the company, it was intended to have a pontoon bridge, for which plans and specifications were prepared and these were submitted to Mr. E. O. Moriarty, the then engineer-in-chief for the Government. That gentleman, however, ridiculed the idea of a pontoon bridge, owing to the frequent rises in the river, and recommended the construction of a pile bridge. A meeting of the shareholders in the company was then called together, when the matter was considered and it was determined to have a pile bridge. The company, when thinking of erecting a pontoon bridge, applied to the Government to allow a competent surveyor, by the most suitable site for a bridge, and

about Mr. Want, whose name had been before the country for many years, and whatever opinions some people might hold about a recent case with which Mr. Want's name was prominently connected, he felt sure that gentleman possessed the confidence of the people of the country at large. It was certainly no pleasure to Mr. Want to institute proceedings against two members of the Assembly in the case. Whilst dealing with Department of Justice he would refer to his friend Mr. Gould, who had been held up by some of his opponents as being a man without a heart, and without feeling for anybody. They being members of the same Cabinet Mr. Reid was deserving of the good opinions of all. When the Premier first took office many were of opinion that he would not prove himself possessed of the requisite staying power to carry the task of Government through. He thought, however, it would be admitted that Mr. Reid himself to be the right man in the right place. Mr. Brunner, the Colonial Secretary, was a man who held the respect of every thinking man in the colony, though he was better known in the Northern and Western districts than he would be to the people of Wagga. As regards Mr. Carruthers, the Minister for Lands, it would be remembered that when it was first known that he was to take charge of the Lands Department, their opponents laughed at the appointment, asserting that he possessed no qualifications for the position, and constantly thrown together he might naturally claim to know more about Mr. Gould than outsiders, and he could say that anyone asserting that Mr. Gould was wanting in heart had formed a very false estimate of that gentleman's character. Mr. Sydney Smith was one of most progressive ministers that ever held office, in fact was rather too progressive for some members of the Cabinet. Mr. Smith was very anxious to establish Experimental Farms in various parts of the country, which would be all very well if they could be established without increasing the taxation of the country. It must be remembered, however, that the Government as a Government had no money of its own, but only had the power to raise money by taxation. He did not like to see the Government taking up work which was not generally considered Government business. He always liked to see private enterprise take up things that could be done better in that way than by the Government. He would not detain them longer, but would say that he felt sure they held kindly feelings towards the present Ministry, and he had no reason to doubt they had some kindly feeling towards him. (Hear, hear.) He would, in conclusion, thank them for the hearty way they had received the toast, and he wished them, one and all, health and prosperity to their life's end.

Mr. Coleman proposed the toast of "The Parliament," associated with the names of Messrs. Gormly and Fitzpatrick, whom he said were associated with all public functions in the district. Mr. Gormly was of course best known to them, but Mr. Fitzpatrick was also a familiar figure, and they were pleased to welcome him amongst them. They owed a deep debt of gratitude to their representatives for the faithful and able manner in which they had served them in Parliament.

The toast was drunk with musical honors. Mr. Gormly said it was a very difficult matter to respond for the Parliament without referring to politics, but he would not be justified in doing so before such a gathering, composed as it was of men of different opinions. He was very thankful to the

citizens of Wagga for the way they had received his efforts to give them a perfect structure as possible had not resulted more successfully financially to himself. He trusted, however, that his efforts would favourably impress the Department with his determination to always carry out what he undertook, and that in some future contract he might have reason to be better pleased with the result of his labours. He could not conclude, however, without expressing his sincere thanks for the kindness bestowed upon him by the people of this town and district, and would ask them one and all to receive his deepest wishes for their lasting prosperity and happiness.

Mr. Fosbery proposed the toast of "The Resident Engineer, Mr. W. F. Burrow." It was Mr. Burrow who was sent to Wagga to overlook the construction of the bridge and keep the contractor up to the mark. He asked them to drink to the health and prosperity of Mr. Burrow.

The toast having been heartily drunk Mr. Burrow suitably responded.

Mr. Hayes proposed "The army and navy and the church." He thought the Minister must have felt gratified at the manner in which the local military force went out that day. He himself was greatly interested in their military affairs. Besides being captain of the Rifle Reserve, he was for over 20 years connected with the Yoomany Cavalry in the old country. They had men in the rifle reserves who were the very backbone of the country. They were the men who had made the colonies and were the men who would maintain the colonies. There might be greater danger of the invasion of Australia than they thought for. He thought the Government should be more generous when dealing with the military estimates, and be less unwilling to spend money in the defence of the country. He believed the Minister for Works, Mr. Young, came from a place within a stone's throw of where Frohisher and Drake were playing bowls on the eventful day when the Spanish Armada hove in sight. They must have Australia for the Australians, and Australia must be mistress of the Southern Pacific. He would now allude to the church, and he might say that it would be a bad day for Australia when their churches were not patronised.

The Bishop of Goulburn responded on behalf of the church, expressing the pleasure it gave him to join in that exceedingly pleasant festive occasion. Since he arrived in Wagga he had visited the Public Schools, which he considered were equal to any in the diocese of Goulburn. He had also visited the Hospital, and certainly it was one of the best organised and cleanest hospitals he had seen.

Lieut. Jefferson, commanding officer G Coy. 1st Regt. of Infantry, responded on behalf of the Military Forces, and in doing so expressed regret at the departure from Wagga of Mr. Stokes, the contractor, who had been attached to G Company as 2nd-Lieut. during his stay in Wagga.

Mr. Fosbery, as an old naval officer, responded for the navy, and contended that although the efficiency of the British army must be maintained, still the supremacy of Great Britain could only be maintained by the Navy.

The Hon. J. H. Young then proposed "Prosperity to the Wagga District." He thought Wagga had much to be thankful for. In Messrs. Gormly and Fitzpatrick the district had two good representatives. The town had evidently good representatives in the Municipal Council, as was evident from the state of the streets and the town generally, including the beautiful trees which were to be seen.

secretary of the company. When the company altered its intention and determined on building a pile bridge, Mr. Moriarty, the Engineer-in-chief, sent Mr. David Houston, to make a survey of the river for a distance of one mile on either side of the town in order to fix the best site for the bridge. A report and plan giving the result of this survey were sent down to Mr. Moriarty, who on examining them fixed the site of the bridge within 20 feet of the place pointed out by Mr. Adams, without knowing where Mr. Adams had fixed it. Mr. Moriarty then prepared plans and specifications of the bridge, and the tender of Mr. David Baillie was accepted for the erection of the bridge for the sum of £5500, which tender, however, did not include the making of the approaches. The first pile of the bridge was driven on the 1st January, 1862, by Mrs. F. A. Thompson, the wife of the oldest resident. During the year the bridge was in course of erection there were only two rises in the river, the highest being only 15 feet, and in this respect the state of the river was more favourable than in any year known either before or since. On the completion of the bridge it was formally opened for traffic on the 27th October, 1862, the opening ceremony being performed by Mrs. F. A. Thompson, who named it the "Wagga Wagga Bridge." The total cost of the structure and approaches was £8012, the balance over and above the capital of the company being borrowed to meet the liability. On the opening of the bridge Mr. H. M. Todhunter, now manager of the A.J.S. Bank at Parramatta, was appointed as the first paid secretary to the company.

The first toll-keeper on the bridge was Mr. John Mackay, the scale of tolls being as follows:—8d for each footman, 6d for each horseman, 1s per wheel for each vehicle, and in addition 4d for each animal drawing it. No charge was made for anyone returning again on the same day. Sheep crossing the bridge were charged for at the rate of 3d per head, and cattle or horses in droves at the rate of 3d per head. Mr. John Leeson was subsequently appointed tollkeeper on the bridge and continued to hold the position until the structure was taken over by the Government.

At the time the bridge was erected there was no other bridge over the Murrumbidgee at any part of the river. The Wagga crossing place had always been more used than any along the Murrumbidgee, and it was the existence of this crossing which first brought about the settlement where the town of Wagga now stands, the first settlers however making their habitation on the northern side of the river. Even so late as 1884 when the bridge was taken over by the Government there was no crossing place, nearer than Hay on the one hand and Gundagai on the other. The Narandera bridge was, however, opened shortly afterwards. When the construction of the bridge at Narandera was first mooted, the residents of that town were desirous of forming a company to erect it, but the Government refused to grant them a charter and the erection of the bridge then remained in abeyance for about 11 years before it was taken in hand.

After the old Wagga bridge had been in existence for 10 years Mr. Moriarty, the engineer in chief, paid a visit to Wagga for the purpose of inspecting it and he then declared that it was the best managed and best preserved bridge he had seen. Just previous to that, in 1870, four unusually high floods were experienced in succession which necessitated the spending of £150 on repairs to the structure. Fortunately the company had a good reserve fund by which means they were able to meet the unexpected expense.

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The toast was responded to by Mr. B. B. Bennett and J. J. McGrath.

Ald. Edoey drew the attention of the Minister to the necessity of establishing an ammunition factory within the colony, so as to provide against the possibility of the English supply being cut off.

Mr. McGrath proposed "The Municipal Council," which was responded to by the Mayor, as the oldest member of the Council present.

The toast of "The Ladies" was proposed by Lieut. B. Shaw, and responded to by Mr. W. J. Hanna.

Ald. Beeson proposed "The Press," and the toast was acknowledged by representatives of the local papers.

The Hon. J. H. Young proposed the health of the Chair and Vice chairman.

The toast was heartily honored, and responded to by the Mayor and Mr. Henry Baylis, P.M.

The company then broke up, and shortly afterwards the Minister left for the railway station, taking his departure by the mail train for Sydney.

#### THE NEW BRIDGE.

The following will give some idea of the new bridge that was opened yesterday:—

The Wagga bridge is erected close to the site of the old Company's bridge. It is a timber truss bridge of the Howe type, and includes special features introduced by the Public Works Department to meet the requirements of this colony, by using the native timbers in its construction. It consists of three truss spans of 110 feet centre, eight 85 feet, and one 81 feet timber beam approach spans, making a total deck length of 671 feet.

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When granting the charter to enable the company to erect the bridge the government reserved to themselves the right after 21 years to take over the bridge from the company, the purchase money to be the actual cost of the bridge with 10 per cent added. In accordance with this proviso in the charter, the bridge was taken over by the government on the 29 February 1884.

Previous to the erection of a bridge over the Murrumbidgee the only means of crossing was by a punt, the proprietor of which was Mr. Henry Moxham. This punt conveyed passengers, livestock and vehicles across at the following scale:—6d. for each foot passenger, 1s 6d for each horseman, 9s for a horse buggy, 12s for an empty horse or bullock dray and 20s for a loaded dray.

In 1861 a Private Act was passed empowering the Wagga Bridge Company to construct a bridge, and giving them exclusive right of ferry over the river for two miles above and below the same for 21 years from the date of completion; at the expiration of that time the Government reserved the right to claim the bridge at cost price, plus 10 per cent. The Government contributed £1500 for the approaches, and the bridge consisted of four laminated timber arch spans of about 70 feet, with timber piers and approaches, giving a carriage way of 17 feet 6 inches, and two footways of 8 feet each, the total length of bridge being 610 feet. Tolls were abolished from 29th February 1884, on which date the bridge was handed over to the Government. In 1893 the bridge was reported to be beyond repair.

#### FREING OF THE OLD BRIDGE.

The Wagga Express of 4th March, 1894, gives an account of the freeing of the bridge, which took place on the previous day. The report states that, in accordance with a resolution

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passed at a large gathering of residents at the Wagga Town Hall held during the previous week, a public demonstration in honor of the Wagga bridge, which was formerly held by a company, being opened for traffic free of charge. The Government concluded the purchase of the bridge on 29th February, 1884, and from noon that day no tolls have been demanded. The opening day (3rd March) was one of general rejoicing in Wagga, the day being proclaimed a public holiday, and the stores being closed. At eleven o'clock in the forenoon a large crowd had gathered at the Town Hall, flags were displayed in the town in honor of the occasion, and a procession formed and marched over to North Wagga where, after a short halt, the bridge was re-crossed, and the procession headed for the racecourse where sports had been arranged. There were fully a thousand present, and in response to a request by the Mayor (Mr. James Gormly) three ringing cheers were given on the bridge in honor of the acquisition of the public of the advantages of a free crossing over the Murrumbidgee. The procession, which was of a great extent, included many vehicles and horses. It was led by the Southern Star Lodge of Odd-fellows, who numbered 175. The Sons of Temperance came next, between which body and the No. 8 Queen of the South Loyal Orange Lodge, the Town Band discoursed lively music. The aldermen of the borough of Wagga were driven next in order by the Mayor, following the drag being the general public in vehicles, on horseback, and on foot. The event passed off without the slightest hitch or accident, so effective were the efforts of the police in the direction of the traffic. The procession wended its way to the Wagga racecourse, where a programme of sports including horse and foot racing was entered upon, there being an exceedingly large gathering to witness them.

OPENING OF THE OLD BRIDGE.

27th October, 1862.

The following is an extract from the Wagga Express of 31st October 1862, giving the particulars in connection with the opening of the Company's bridge:—

Monday last was indeed a red letter day in the annals of Wagga Wagga, and we never remember to have seen our little town under so holiday an aspect as it then presented; indeed it was almost matter of surprise whence the crowd could have been collected which thronged our streets. The day was fine, though somewhat warm, and we believe we may fairly say that every man, woman, and child in Wagga Wagga turned out to do honor to the auspicious event. The hour fixed for the ceremony was noon, but, as usual, punctuality did not prove a distinguishing feature in the proceedings, for it was nearly two o'clock before the Directors made their appearance in front of the Court-house, whence the procession was to start for the bridge; however, after some grumbling at the delay, the cavalcade was got into marching order, under the superintendence of Messrs. Turner, Whitehead and Hardy. The line was headed by Messrs. Moxham and Hassett, bearing two flags, on one of which was emblazoned the words "Success to the bridge," and on the other "Success to private enterprise"; a carriage in which were two musicians, the largest procurable band, followed, and following these came a mail phaeton drawn by four splendid bay horses, the property of H. W. M. Esq. and conducted by the driver of the mail coach, who was to be

remarking that in the whole of those vast dominions, which the sun ever set, Her Majesty had no more loyal subjects than in Wagga Wagga; nor, moreover, were there any who more appreciated Her Majesty's attachment to her people than those of this township. The toast having been duly honored, the Chairman proceeded to give the health of the Prince of Wales, who would in the course of nature be our future sovereign, although might the day be long distant; there was no doubt but that he would do credit to the example of his lamented father, and as on the 9th of next month he would attain his majority, the least they could do was to drink his health now, as there would not probably be an opportunity of paying him that compliment on his birthday.

The next toast was the health of the Governor-in-chief; the president remarked that Sir John Young, for the short period during which he had held the reins of Government had shown himself a supporter of all useful undertakings, and whenever the opportunity had presented itself he had ever given his vicereal support to good purpose; he had in short proved himself a good Englishman and a good man. The toast was warmly acknowledged.

At this point of the proceedings Mrs. Brown, the widow of the original proprietor of the Wagga Wagga Punt, was seen to drive over the bridge, and was loudly cheered. The down-river mail was also cheered on crossing shortly afterwards.

The Chairman next gave "Her Majesty's Ministry," remarking that this compliment was due to them on this occasion; whatever political differences of opinion we might hold, there could be no doubt that they had done much for us; they had given us a system of telegraph which placed us in immediate communication with most parts of this and the adjoining colonies of Victoria, Queensland, and South Australia; they had given us votes for roads, and above all they had on his (the Chairman's) own application to Mr. Cowper, given a subsidy of £1500 for the approaches to the Company's Bridge. The toast was not very warmly received, the ministry being manifestly unpopular with most of those present.

The Chairman gave the health of Mrs. F. A. Tompson, the lady who drove the first pile of the bridge, and had that day completed the work she had begun. Her name would now be inseparably connected with the greatest public work in the southern districts; he would then propose the health of Mrs. Tompson, connecting with her those ladies who had been present at the ceremony that day.

Mr. F. A. Tompson rose to acknowledge the toast, which he said he had much pleasure in doing; he could assure them that no lady in the district had a greater stake and interest in it than Mrs. Tompson; she had reared a large family here, and hoped here to end her days; she had never lost an opportunity of doing good in the district, nor would she ever lose one.

The Chairman then gave the toast of the day, viz. the health of the guests. Mr. Baillie, the contractor of the bridge, Mr. Elder, his superintendent, whom all knew to be a most worthy man, and though last not least, Mr. Houston, the engineer. In proposing the health of this happy trio, he would join with theirs the name of a gentleman known widely for his engineering skill, Mr. E. O. Moriarty, by whom the bridge had been designed; notwithstanding all difficulties that design had been now carried out, and although many of the original shareholders had withdrawn their names, he was

opportunity of bearing testimony to the orderly behaviour of the workmen who had been employed on the bridge works; during the ten months the bridge has been in progress, no one of the workmen had been brought before the Bench; indeed, the fact of a man having been employed on the Wagga Wagga bridge was a certificate of good conduct; if there were no more occasion for police than was given by Mr. Baillie's men, our force would be amply sufficient. Mr. Tompson gave "The workmen of the bridge." Paul might plant, and Apollos might water without result; and shareholders and managers might find money, they might find an efficient contractor like Mr. Baillie, but without the workmen those thews and sinews of the war all would be of no avail.

Mr. Elder returned thanks on behalf of the workmen.

Mr. Tompson said that as improvements advance old things must give way to the new; the old punt had been superseded by the new bridge, but the punt had been long the only medium of communication between North and South Wagga Wagga. The punt was originally established by Mr. Brown, under difficulties which few now present could conceive, but he had kept up communication even when the river was so low that the punt had actually grounded in the middle of the stream, and also when floods had reached the middle of the police paddock. His son-in-law, Mr. H. Moxham's interest was wrapped up in the punt, and no one could fail to admire the interest he had shown that morning in a speculation which was actually taking away his livelihood; he had that morning carried the flag at the head of the procession, a thing which few persons under his circumstances would have done. The speaker gave "Harry Moxham, and success to him."

Mr. Willans returned thanks on the part of Mr. Moxham, remarking that although the punt had been regarded by many as a public incubus, on account of the high rates charged, still Mr. Moxham expended all his money in the district, which, therefore, reaped a corresponding benefit.

The Chairman proposed the Press, the Palladium of our liberties. The local press had ever been a warm advocate of the Wagga Wagga Bridge; it had upheld the directors in every way, and the bridge had originated with Mr. F. B. Price, formerly proprietor of the paper; the Express had since passed into other hands, but it had steadily continued to support the enterprise. The newspaper and the telegraph were perhaps the two greatest blessings ever given to mankind. He would give the "Press and the Express."

Mr. Trollope replied, adverting to Mr. F. B. Price's connection with the Bridge Company, and to the interest that gentleman had taken in the progress of the district.

Mr. Bentley also expressed his acknowledgment of the compliment paid the local paper.

Mr. Trollope proposed the health of Mr. James Shelly, the new C.P.S., which that gentleman acknowledged.

Mr. F. A. Tompson proposed the health of Mr. W. Macleay, the member for the district.

The seditant broke up about 7.30 p.m., and the amusements of the day were concluded by a dance improvised at the Royal Hotel, which was numerously attended and kept up till daylight did appear.

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lowed by a numerous troop of horsemen and the people on foot closed the procession. On arrival at the bridge, a chain which had been stretched across the roadway was removed, and the procession crossed in good order to the north side, when the vehicles and horsemen proceeded at a slapping pace to North Wagga Wagga, and returning thence, the line was again formed on foot and marched to the centre arch of the bridge, where a bottle of Gregadoo wine was suspended for the purpose of "christening" the bridge. Mr. George Forsyth then led forward Mrs. F. A. Thompson, and briefly addressed the assemblage. He said:—"Gentlemen and fellow citizens of Wagga Wagga,—This day must be regarded as in every respect the brightest that has ever graced the annals of the history of Wagga Wagga; it is one to which most of us have long looked forward, and now that it has arrived it is gratifying to witness the good order and aspect of unanimity which prevails. There had been some slight differences with reference to the bridge, and difficulties in the way of the Company, but these are now happily overcome, and the noble object has been attained." In conclusion, Mr. Forsyth introduced Mrs. Thompson, who, he said, would now name the structure the "Wagga Wagga Bridge," that being the style decided on by the proprietary as calculated to mark the proud position of Wagga Wagga as being the spot at which the first bridge across the noble Murrumbidgee is now erected. Mrs. F. A. Thompson then taking in her hand the string which was attached to the bottle, said distinctly: "I name this bridge the Wagga Wagga Bridge," and letting slip the cord, the bottle was dashed to pieces against the arch. Three prolonged cheers were then given for the bridge, three more for the contractor, three for Mr. Houlison, the engineer, three for the Shareholders, three for the workmen of the bridge, and finally three for Mrs. Thompson. Mr. F. A. Thompson then came forward, and in his turn congratulated the people on the happy occasion of their assemblage there; it was, he said, one of which the people of Wagga Wagga might be justly proud, and one which will be prominent in the history of Wagga Wagga, whenever that history shall be written; and when the difficulty of obtaining mechanical labor and appliances in so remote a district was considered, it was even the more creditable to the Company; he regretted to say that the Directory had not met with that share of support which they had a right to expect; they had met with difficulties in the disposal of shares, which were the more discouraging, as this was one of the very few joint stock speculations ever undertaken without selfish ends; many persons had held back because they did not believe the undertaking could possibly be carried out, or if it were so, none that it would be possible to erect such a bridge as would resist the mighty floods such as had been witnessed in the Murrumbidgee. The Directors had been compelled to borrow money on their own personal security, but now the bridge was complete, he hoped the public would afford it support, and that every man and woman would become a share-

Mr. Baillie briefly responded, saying that he rose more to make an apology for no speech than a speech itself. He congratulated the district on the completion of the important work they had met to celebrate, and concluded by wishing every success to the Bridge Company and to the district. Mr. Elder briefly acknowledged the compliment paid him, and expressed his sense of the kindness he had experienced while resident in the district. Mr. D. Houlison said that his stay in Wagga Wagga had been rendered gratifying by the kindness he had met with on all hands, and it had been doubly pleasant on account of the gentlemanly conduct of the directors, contractor, and all connected with the work; the season, too, had been remarkably favourable for the operations of the Company; he congratulated the people of Wagga Wagga on having a bridge, which for lightness and elegance of structure would compare favourably with any in the colonies. He wished Mr. Baillie every success, and would at all times be happy to meet him in a similar capacity to that in which they had been lately connected. With reference to Mr. Moriarty, he could not allow the opportunity to pass without alluding to the shabby way in which the Legislature had treated that gentleman with reference to his late visit to Wagga Wagga. In conclusion, Mr. Houlison once more expressed his thanks for the cordiality he had met with in Wagga Wagga, and especially for the peculiar kindness of the ladies. Mr. Church proposed the health of the Directors, remarking that so much had already been said about the bridge that it was needless for him to say more. There was the bridge to speak for itself, and clearly showing that the directors must have done their duty. Mr. Wallace responded: He said that the directory had spread no endeavours to carry out the undertaking satisfactorily, they had met with some obstacles, but they had always happily succeeded in overcoming them; in short, they had done their best, and the result of their doings would, he was sure, prove a great advantage to the whole of the southern districts and would considerably enhance the value of property therein. Mr. F. A. Thompson gave the health of Lady Young and the ladies of the colony. As far as we could judge by report, Lady Young had already done a great deal of good in the country. For the ladies generally, of course every district held its own opinion of their relative merits, and each one naturally thought its own ladies the best. Mr. James Warby rose on behalf of the ladies, expressing his sincere and heartfelt regret that none were present. Mr. F. O. Thompson, being called on, said he thought Mr. Warby had not said half enough; for himself, he could not say half as much as he felt on this theme; he was a bad speaker at best, but they must take the will for the deed; what his lips could not express, his heart felt; he was a bad representative of the sex, but he did love the ladies; he was his father's son, and he liked his father's taste.

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holder, if only to the extent of a single share. Mr. Tompson then, in the name of the Directory, declared the bridge open for public traffic. "God Save the Queen" was then sung, and the assemblage adjourned to a neighbouring tent, where a goodly supply of ale and wine had been furnished by the Directors. Immediately after the conclusion of the ceremony the bridge was brought into active requisition, almost everyone who could raise a horse or a vehicle crossing and recrossing from side to side. A dray, on which were mounted a number of uncomfortably crowded men and boys, was received with especially vehement cheering, being drawn by the first bullock team which had passed over the new bridge. It had been contemplated, by the way, to introduce some wool teams into the procession, but the bullocks most perversely declined to work under the circumstances, and that portion of the display was accordingly dispensed with. The greatest good order prevailed throughout, if we except a trifling pugilistic encounter between a gentleman from Campbelltown and a North Wagga Wagga, anxious to maintain the credit of their respective homes.

#### THE DINNER.

The day of opening the bridge was appropriately selected as a fitting occasion to give expression to the regard and esteem in which are held by our town folk, Mr. D. Baillie, the contractor; his superintendent, Mr. Elder; and Mr. Houlson, the engineer; and these gentlemen were accordingly entertained at a public dinner given in their honor. The hour originally fixed for the banquet was 3 o'clock, but, more Wagga Wagga, it was fully 5 p.m. before the board was spread with the excellent cold collation prepared by Millenst Brothers. The supply of wines, &c., was good in quality and abundant in quantity; the commodious tent in which the tables were laid being open towards the river, was admirably adapted to the extreme warmth of the weather, while it appropriately allowed an uninterrupted view of the bridge. Between fifty and sixty persons sat down, Mr. Foreyth presiding, and having on either hand the guests of the day. Messrs. Baylis, P.M., and F. A. Tompson acted as crooners.

The more substantial portion of the repast being disposed of, and glasses charged, the Chairman proposed the health of the Queen.

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Mr. McCracken was loudly called on, and said that it appeared to him that both Mr. Warby and Mr. Tompson in their enthusiasm for the ladies generally, had forgotten Lady Young altogether (cries of no, no), however, they had both spoken so well, and the last speaker, in particular, so eloquently, that they had left him nothing to add.

Mr. F. A. Tompson then proposed the pastoral, agricultural, and commercial interests of the district, all of which must ever go hand in hand.

Mr. E. C. Pearson responded on behalf of the pastoral interest.

Mr. James Warby, as a member of the commercial interest, acknowledged the toast. He had recently visited two of the adjoining colonies, as well as Sydney and other places in New South Wales, and nowhere did he see the commercial interest in a more flourishing condition than in Wagga Wagga; he himself as an individual had done all he could to further the commercial interest of the town, and he should always continue to do so.

Mr. Patrick Pennell replied on behalf of the agriculturalists; he said he had now been fifty years connected with that interest; agriculture must ever go hand and hand with pastoral and commercial pursuits; all were flourishing in this district; and would continue to be so, more especially now the excellent structure they had just seen opened was complete; the district had this season been peculiarly favoured by Providence, and such crops as we shall have here, are to be found in no other part of the colony, and no matter what dearth elsewhere may prevail, there is no fear of the staff of life failing in Wagga Wagga.

Mr. F. A. Tompson proposed the health of the Bench of Magistrates of the district. He said it was of little avail for any man to strive individually for the benefit of the country, unless there were a good administration of the law, tempered by justice and mercy. The decisions of the Wagga Wagga Bench were generally good and impartial; the police force was perhaps inadequate to repress fully the evils arising from the mismanagement of the gold-fields, but the good order prevalent here was highly creditable to the district and to its Magistrates.

Mr. Baylis, as President of the Bench of Magistrates, returned thanks. He did so with the more pleasure as it afforded him an

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# MINISTER FOR WORKS AT WAGGA.

## OPENING THE "HAMPDEN" BRIDGE.

(BY TELEGRAPH.)  
(FROM OUR CORRESPONDENT.)

11 NOV

WAGGA, Monday.

The new bridge over the Murrumbidgee was opened to-day by Mr. J. H. Young, Minister for Works. The Minister arrived by the morning mail from Sydney, and was met at the station by the Mayor and aldermen. The ceremony took place at noon. The Minister and the municipal party were escorted to the scene, by the local volunteer company, with a band. The attendance was very large, notwithstanding that the day was not observed as a general holiday. The children attending the local schools to the number of 500 were present. The bridge was christened by the Mayor in the orthodox manner, and was named the Hampden Bridge, after the new Governor of the colony.

The Minister, in declaring the bridge open to traffic, gave some interesting particulars. The new bridge is erected close to the old company's bridge. It is a timber truss bridge of the Howe type, and includes special features introduced by the Public Works Department to meet the requirements of the colony by using native timbers in its construction. It consists of three truss spans of 110ft centres, eight of 35ft., and one of 31ft. The timber beam approach spans make a total deck length of 671ft. The structure is carried upon iron cylinders. The piers are filled in with concrete. The height of the roadway above the summer level is 42ft. 3in. The highest recorded flood level was 26ft. 9in. above summer level in 1881. The new approaches have a grade of 1 in 10 from the main bridge to the Junee road, and during the flood seasons traffic will have safe access to the bridge. This will be of great importance to the Wagga traffic, for the old approaches were impassable during floods, and accidents were frequent occurrence. The carriage way is of exceptional width.

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Calculating the superficial area of the deck the Wagga Bridge is one of the best traffic bridges in the colony. The roadway on the main spans is 23ft. between kerbs and 24ft. The approach spans 28ft. A foot path on the way 4ft. 6in. wide is provided on the up-river side. The truss spans are braced overhead with timber struts and diagonal rods. The clear roadway from the deck is 19ft. To provide an easy grade for the earthwork approaches on the left side a massive concrete retaining wall 400ft. long has been erected, and traffic will now pass over a roadway 40ft. wide. The footway on this approach is 18ft. wide, forming a continuation of the footway on the town footpaths. The total cost of the bridge was £13,200. There are 132 tons of ironwork in the piers and 73 tons in the superstructure. The ironwork was supplied by the Atlas Company, of Sydney. 17,000 cubic feet of carefully selected ironbark timber and 7500 cubic feet of tallow wood, brought from Wyong and the coast, have been used. The iron piers, which are 7ft. 6in. in diameter at the base, have been sunk from 30ft. to 35ft. below the bed of the river, and required 270 cubic yards of concrete. The total quantity of concrete used throughout the work was 720 cubic yards. The contract for the supply of ironwork and the erection of the bridge was let to Mr. Stanley F. Stokes, of Newcastle.

After the opening ceremony the Minister was entertained at luncheon at the Criterion Hotel. About 60 of the leading residents were present, the Mayor presiding.

The toast of "The Ministry" was proposed by the Mayor in distinction terms, and was responded to by Mr. Young, who, however, made no remarks of political importance. His experience proved, he said, that the Government was appreciated in every part of the colony, because it was believed that Ministers were honestly endeavouring to carry out the policy which they firmly believed would advance the general prosperity of the people. He thought they would be successful in their endeavours, although it was probable they would not be able to do all they intended. If, however, they were able to arrive at some settlement which would give the colony the benefit of better trade they would have done a great work.

General toasts were proposed, and the proceedings passed off pleasantly. The Minister left for Sydney by the evening train.

END

## A New Bridge Opened.

WAGGA, Monday.—The Minister for Works, accompanied by Messrs. Gormly and Fitzpatrick, representatives of the Wagga and Murrumbidgee Electorates, attended Wagga to-day, and were met by the Mayor and aldermen, for the purpose of opening the new traffic bridge over the Murrumbidgee River. A procession was formed, headed by the Wagga Infantry, in charge of Lieut. Jefferson, and the town band, followed by the Minister and aldermen. The party went on to the centre of the bridge, where addresses were delivered. The Mayor (Alderman R. S. Heydon) introduced the Minister, and spoke of the early days' traffic over the old bridge, and of the previous inconveniences to which traffic had been subjected. Mr. Gormly spoke, and referred to the good work done by the old bridge, and said that fifty years ago there was only one bridge over the river. He spoke of his interest in district matters, and his efforts in the direction of the new bridge.

Mr. Young said he would not make a political speech, but congratulated all on the excellence of the structure, which was creditable to the department and contractor. It was the largest timber bridge in the colonies, and was a complete departure from the type hitherto adopted in New South Wales. The old bridge was purchased by the Government for £9800 and the new structure cost £13,000. After giving the capabilities of the bridge, Mr. Young called upon the Mayoress to name the bridge.

Mrs. Heydon came forward, and broke a bottle of champagne on the rail, and named it "The Hampden Bridge," in honor of the new Governor of the colony.

Cheers were then given for the Queen, Minister, and others. The Minister was

